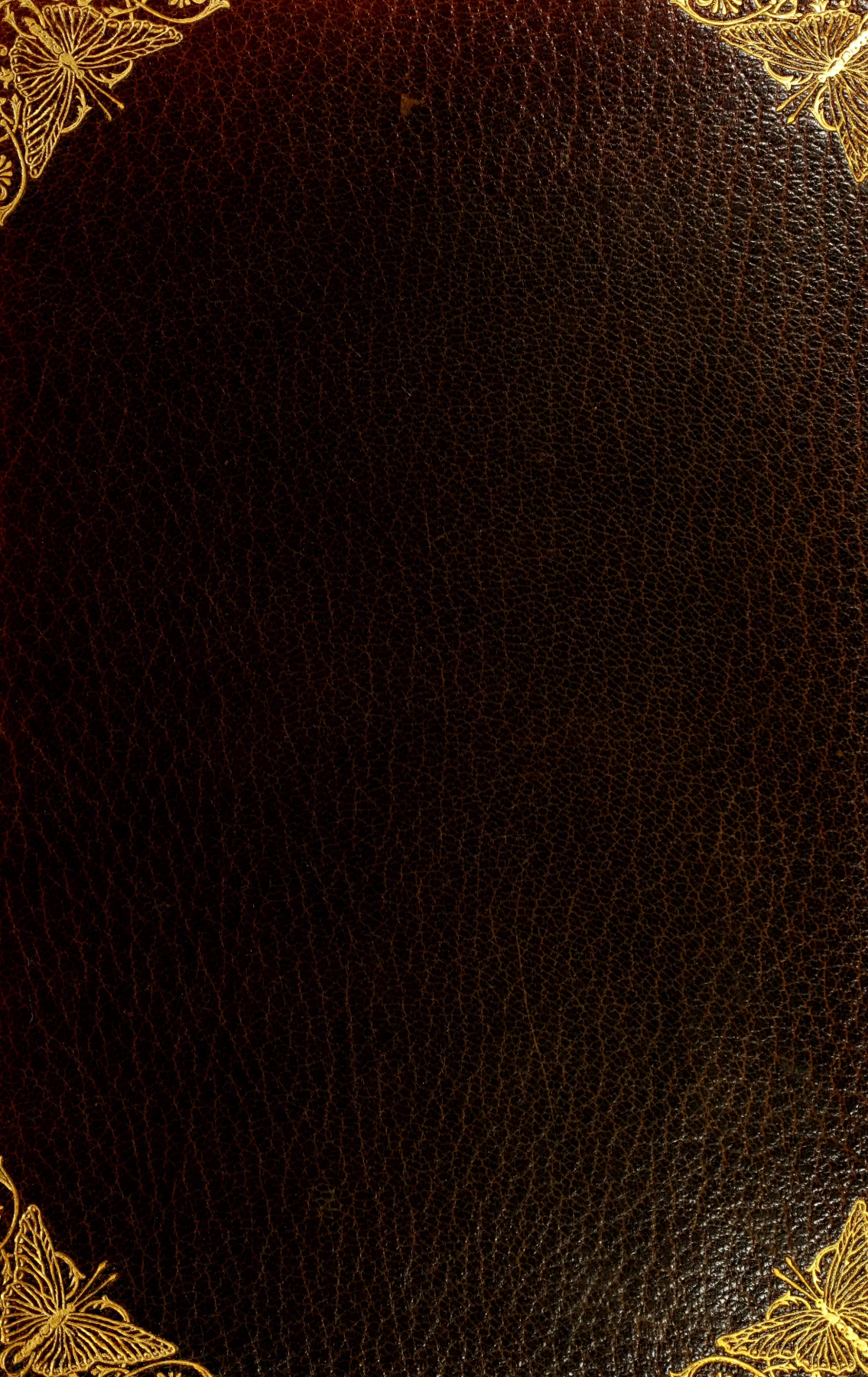






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Upper Side



Under Side

PYRAMEIS CARDUI

As Nature Shows Them

MOTHS AND BUTTERFLIES

OF THE

UNITED STATES

EAST OF THE ROCKY MOUNTAINS

With over 400 Photographic Illustrations in the Text and Many Transfers of
Species from Life

BY SHERMAN F. DENTON

VOLUME II

THE BUTTERFLIES

J. B. MILLET COMPANY

BOSTON

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RHOPALOCERA

THE BUTTERFLIES

SUB-ORDER RHOPALOCERA. *The Butterflies.*

THE hard and fast lines fixed by naturalists do not really exist in Nature. As daylight blends into darkness and night again into day, or as the colors of the rainbow softly shade into one another, the violet into the blue, and the blue into the green, etc., so the different groups of insects pass by almost insensible gradations one into another.

The most noticeable difference between the moths and butterflies is in the shape of the antennæ, being nearly always pointed in the former, and blunt or knobbed at the ends in the latter. This, however, is by no means a sure guide, as many of the Sphingidæ have club-shaped antennæ, while the lowest group of the butterflies, the *Hesperidæ*, are furnished with antennæ having hooked extremities with acutely pointed ends.

None of the butterflies have the wings joined with the loop and bristle usually found among the moths. The butterflies are all day-flyers, thus differing in their habits in a marked degree from the majority of the moths.

The surface of the eggs of butterflies is often ornamented, while the eggs of most of the moths are plain and smooth. The larvæ of all butterflies, with the exception of a few of the lower species, are external feeders, and, unlike the moths, except among the *Hesperidæ*, they spin no cocoons, the naked chrysalis being usually suspended from a silken mat by the posterior extremity and either with or without a band of silk about the middle of the body.

These chrysalides are of various shapes, some angular, others bearing spines and horns, while many of them are objects of extreme beauty; as handsome as jewels and looking exactly as if embossed with gold. The chrysalis stage usually lasts about twenty days, although in a number of species the winter is passed in this stage.

The butterflies, while at rest, usually hold the wings upright, back to back, while the same organs in the moths are generally folded roof-shape over the abdomen, or expanded flat upon the support of the insect. In coloring, the butterflies are generally much more striking than the moths, their wings being ornamented in many

species with bold dashes of color, lacking that soft blending so characteristic of most of the moths.

The butterflies, too, though strong and rapid of flight many of them, have much smaller bodies generally in proportion to the size of the wings than the moths. The eyes are usually well developed, and the tongue is sufficiently long to enable the insect to extract the sweets from flowers, or sip moisture from the ground. The legs of butterflies are usually well developed, except in the *Nymphalidæ*, where the first pair are nearly aborted.

HESPERIDÆ.

Skippers.

The most moth-like of all butterflies are the *Hesperidæ*, a group containing a host of small, plain-colored insects, usually very abundant in our fields and meadows.

These insects are stout-bodied creatures with large heads, prominent eyes and hooked or pointed antennæ, suggesting those of the Sphinx moths, placed wide apart at their base. The palpi are thick and hairy, making them look blunt and clumsy. The lower wings, while the insects are at rest, are often spread horizontally, while the forward pair are raised nearly vertically above the back. In coloring, they are usually very plain, black, brown and tawny-yellow predominating in our native insects. A few of the tropical species, however, are gayly colored. Some of the species bear tails similar to those on the lower wings of the *Papilios*. The flight of these insects is rapid, but generally continued but for short distances at a time. The jerking manner of their movements, with their restless darting from place to place, has earned for the group the common name of skippers. They are lovers of flowers, and the fields of clover, the blossoms of milkweed, elder and various lowland shrubs and plants usually swarm with them.

The larva of the *Hesperidæ* is cylindrical in the middle, tapering toward both ends. It has a large head placed on a narrow neck, which gives it a most peculiar appearance. It is smooth, naked, or at the most, downy and usually of dull and sombre tints. It is solitary in its habits, and is largely a night feeder, inhabiting by day a neatly constructed nest made of silken threads inside a curled leaf. When not feeding, the larva retreats into this nest, and its large, hard head acts as an operculum, completely filling the entrance and

keeping out its enemies, reminding one in this respect of the larva of some species of caddis flies. The chrysalis is smooth, shaped like



Larva of Hesperidae. (*Eudamus tityrus*.)

that of a moth, and is powdered with a bluish dust. It is suspended by the tail within its thin silken cocoon, and has a thin band of silk passing around the body after the manner of the *Papilionidæ*.

At the beginning of the skippers, as they are often termed, is a genus of large, powerful insects which inhabit the southern states, New Mexico and Arizona, known to entomologists by the name *Megathymidæ*, or giant skippers. In this genus the head is not so large in proportion to the rest of the body as in most of the members of this family, but the body is very stout and well supplied with muscles to work the stiff and proportionately short wings, making these insects very strong on the wing. The antennæ, though furnished with a long curved knob, are not pointed nor recurved into a hook as in most of the *Hesperidæ*. These insects fly very rapidly, but seem as if undecided where to go, and dart first to one side and then the other, suddenly alighting, and seldom remaining more than an instant in a place. All four wings are folded vertically over the back when the insect is at rest, differing in this habit in an important degree from the majority of the skippers.

The best known of this genus is *Megathymus yuccæ*, so called from the larva passing the most of its existence in the stem and root of the yucca or Spanish bayonet. The butterfly is dark umber-brown, the base and the margin of the wings being tinged with yellow. The light markings on the outer third of the upper wings are yellow. All four wings are more or less hairy next the body. The under side is much like the upper, the yellow spots being repeated beneath, but paler, while there are gray scales toward the outer portion of both sets of wings. The female is a good deal larger than her mate, measuring three inches in expanse of wing, the male being but two and one-half inches across the outstretched wings. The coloring is much the same in both sexes. I have never seen the larva or chrysalis of this insect, and know nothing of its early life-history, taking the following interesting descriptions, with its habits, from

a quotation by Prof. G. H. French from Prof. C. V. Riley. The larva lives inside the stem and root of the yucca. The eggs, which are pale green, are deposited singly on the leaves, and when hatched the caterpillar conceals itself in a web near the tip of the young leaf. As it grows, it generally works to the base of the leaf, feeding as it goes, entering the stem when it is about one-fourth grown. The young larva is dark brick-red, with the head and top of the second segment pitchy black. The full-grown larva is two and one-half inches in length, and of a dull, translucent white covered with a white, glistening, powdery secretion of a waxy nature.

The burrow made by this caterpillar often extends two feet or more below the surface of the ground. Before pupating, the larva makes a place of exit for the butterfly, lightly closing the cavity near the end. It then makes a cell sufficiently farther down to give room enough to pupate, and in this it undergoes its transformations. The perfect fly emerges in April or May. There is but one brood in a season. There are two other species of this genus found within the borders of the United States, but their life in the caterpillar and chrysalis state has not yet been worked out. They, doubtless, bore in the stems and roots of sub-tropical plants. Central and South America have representatives of this genus.

To the genus *Thanaos* (*Nisoniades*) belong a number of widely distributed, dull brown or black insects with broad, flat wings, having a few small white dots and sometimes a row of dark purplish markings on the upper wings.

These insects usually appear early in the spring, and are among the first which a collector may take with the net. They are to be found along roads or paths in wooded districts, or in open spaces near woods. They delight to sport among low shrubs and bushes, and fly quite rapidly, two or three chasing each other about from bush to bush, often alighting and spreading their wings out flat, holding themselves ready to immediately take wing. They are quite pugnacious, and readily give chase to other insects that may pass their way. Great care is necessary in separating the species, as many of them resemble each other closely. Some are double-brooded, first making their appearance in April and May, and again the latter part of summer. Although so plain in coloring, these butterflies come at a time when the more attractive and larger kinds have not come forth to delight the collector. They are sufficiently numerous that one may secure perfect specimens with no great difficulty, and the most

sombre butterfly has a beauty of its own when perfect and carefully mounted. Then, too, the life-histories of many of the kinds are still unknown, and a field for investigation lies open to the student.

But two only of our more common species of this genus will be described here. *Thanaos brizo* is very common in the eastern and middle states, being found as far west as the Rocky Mountains, and on warm sunny days in early spring may be found along roads and paths through the forests or the young growths of oak. It often alights on the ground or on low herbage. This insect is very sombre in coloring. The upper wings are dark blackish-brown, with two indistinct and ill-defined rows of dark bluish-gray



Thanaos brizo.

oval spots surrounded by black. The lower wings are brown, with two faint rows of yellowish-brown spots near the lower margin. Underneath, both wings have two rows of yellowish spots.



Thanaos persius.

Thanaos persius is a common insect and widely distributed over the continent. The upper wings are bluish-gray, with three irregular

rows of black triangular spots crossing them. The row of spots near the outer margin is tipped externally with yellowish-brown, while the other spots are outlined with gray. There are several clear white spots distributed on the wings, as shown in the illustration. The lower wings are brown with two rows of faint yellowish-brown spots near their outer margins. The body is blackish-brown. The larva feeds on willow and poplar.



Pholisora catullus.

A much smaller species related to the foregoing is *Pholisora catullus*. In this insect the wings and body are black, or very dark blackish-brown, and the wings are unadorned, save with a line of small white spots near the apex of the fore wings. The head and palpi also have a few small white dots. This little butterfly is distributed over the whole United States.

In the genus *Pamphila* is assembled a large number of species (over one hundred being inhabitants of the United States) of small, stout-bodied butterflies, distributed over the whole continent, and often very abundant in point of number. The antennæ usually end in a club with a pointed recurved tip. In coloring they are generally dark brown with spots or markings of yellow or yellowish-brown. The sexes are generally separated without difficulty by the males having a strongly marked oblique brown stripe on the forward wings. These insects abound in the fields and meadows, being particularly plentiful along flowing streams where the sweets of various kinds of wild flowers tempt them to remain. In walking through the rank grasses and weeds beside a brook or pond, one may find dozens of them in June, July and August, and a large number of species may be taken in such localities. A good many will be ruined in the net, however, as they move their wings so rapidly when captured that often only the torn fragments of them remain when taken out. When disturbed they fly rapidly with a jerking motion, and again alight after moving but a few feet. A good many of them fall a

prey to a yellowish-white spider, which hides among the blossoms ever ready for its unsuspecting victims, and clutches the insect suddenly in its powerful fore legs as it works intent upon extracting honey. One may often procure fine specimens by robbing the spiders, for they do not seem to injure the appearance of the insects. The eggs of these insects are frequently pale green, of a high convex shape above and flattened beneath, the surface being often corrugated or ribbed. The larvæ of the *Pamphila* are of various subdued colors, often being pale green and are sometimes slightly downy. They feed upon grasses. The larvæ of a great many species are still unknown.

But a few of the more common species can be illustrated in this work, as very careful descriptions and many illustrations would be necessary to enable the beginner to separate the species of insects often so closely resembling each other.



Pamphila delaware.

Pamphila delaware is common throughout the eastern half of the country. The predominating color is brownish-yellow. The body is



Pamphila mystic.

dark brown, thickly covered with yellowish hairs. The fore wings have a wide band of dark brown on the outer margin, with a brown-

ish shade next the body. The lower wings are surrounded by a heavy border of dark brown.

In *Pamphila mystic*, the body is dark brown, covered with yellowish hairs. The wings are reddish or brownish-yellow, with wide margins of dark brown. The dark brown markings extend along the veins across the yellowish portion, throwing them into relief. This butterfly inhabits the northeastern part of the United States.



Pamphila leonardus.

Pamphila leonardus inhabits the eastern part of the country, both north and south. It is a strongly marked insect, and is more easily distinguished than many of the other species which are frequently exceedingly difficult to separate. The predominating color is dark brown, with a number of clearly cut yellowish spots, their shape and distribution being clearly shown in the figure. The under side is reddish-brown, and much lighter than the upper side. The yellow spots show on both sides of the wings.



Pamphila peckius.

A very common insect belonging to this genus, and found throughout the eastern half of the continent, is *Pamphila peckius*. The coloring is brown, with a yellowish cast, and a number of dull yellow spots and markings adorn both sets of wings. In the male

insect the oblique markings on the forward wings are black, and very strongly defined. June and July are the months for the appearance of this butterfly.

The largest species of the genus found in this country, *Pamphila ethlius*, is two inches in expanse, and blackish-brown in color, with numerous square and diamond shaped translucent whitish spots. It is said to be common in the southern states, particularly along the Gulf, and occasionally strays even as far north as New York. I am not fortunate enough to possess a specimen of this insect.

A number of skippers having antennæ with spindle-shaped ends, and the ground-color of the wings brown, checkered with white spots, belong to the genus *Pyrgus*.

Most of the species belong to the western fauna. They are easily recognized, being quite different in general appearance from the rest of our native skippers.



Pyrgus tessellata.

In the hot summer *Pyrgus tessellata* is a common insect throughout the middle west and south. I have collected specimens in Iowa and Arkansas, but in my experience it is rare in New England, although occasionally taken. This butterfly loves to flit about the grass and weeds in fields and meadows, and is particularly partial to the cleared land along rivers and small streams. It is a rapid flyer for so small an insect and is rather shy. Its colors usually harmonize in a surprising manner with the surrounding dry and dusty vegetation, for it is in July and August that it is most abundant, when through the lack of rain everything in the fields is an uninteresting grayish-brown. It frequently alights on the ground, and with its wings half-spread is not a conspicuous object. The ground-color of its wings is dark brown, the lower half of the upper wings and the inner half of the lower pair being streaked with gray hairs. A number of large and small white spots are scattered over both sets of

wings, arranged as shown in the illustration. The body is slate-brown, thinly covered with gray hairs. The under side of the wings is much lighter than the upper being light yellowish-brown in irregular bars on a white ground.

There is, perhaps, greater variety both in regard to shape and coloring to be found among the different species of the genus *Eudamus* than in any of the other genera of the family. Many of our native species are comparatively large, measuring from one and one-half to two or more inches across the expanded wings. In this genera the antennæ are bent into an acutely pointed hook. One of the largest,



Eudamus proteus.

and also one of the most attractive, of our native species is *Eudamus proteus*. This insect is two inches or more in expanse, the lower pair of wings being prolonged into tails somewhat resembling the Papilios. The upper wings are dark brown, with a number of light yellowish, translucent spots arranged in two vague rows on the outer half of the wing.

The lower wings are also brown, covered on the inner half next the body with metallic-green hairs which, when the insect is alive and moving about in the sunshine, flash brilliant green. The outer edges of both sets of wings are fringed with yellowish-brown, interrupted with black dots. The body is dark brown, clothed with green hairs. The under side of the insect is brown, mottled with darker brown. The yellowish spots are seen from below, but are less sharply

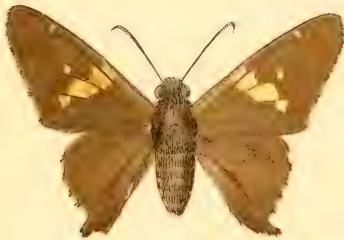
defined. This butterfly inhabits the southern states, and is sometimes seen as far north as New York. It is a common insect in Florida, the larva feeding on various garden plants, such as beans, peas, cabbages, etc., and often doing considerable damage.

We may often find on the locust trees the nests of the larvæ of our beautiful *Eudamus tityrus*. These caterpillars, although often quite common, are solitary in their habits, each one making its separate cell in which it resides during the daytime, coming forth to feed at night. The caterpillar is light green, banded across with lines of darker green, having a reddish-brown head, with two large yellow spots placed where one would expect the eyes to be. These, with the monstrous size of the head, give the creature a very peculiar appearance. When full grown, the caterpillar spins a thin, silken cocoon, usually in a curled leaf, and attaching itself by the tail, with a thread of silk about its body, undergoes its transformations. The butterfly comes forth in June and July, and is to be found about flowering shrubs and weeds in open country, being seldom seen in forests. Along brooks or the borders of ponds are favorite haunts of this butterfly. It is a rapid flyer, and is somewhat shy, although one may approach it closely if care be taken. I have in mind one locality near Lebanon, Ohio, where along the banks of a brook this insect was very abundant, every bunch of flowering weeds having its occupants, the bright, silvery spot on the under side of the lower wings glistening as they moved about in the sunlight. This butterfly has a very wide range, being found over nearly all portions of the United States.

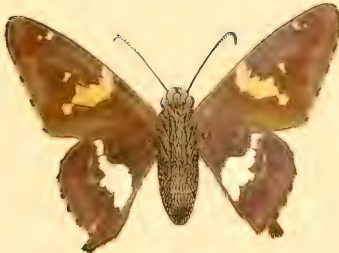


Eudamus lycidas. Upper side.

Another insect, closely resembling the preceding both in size and the coloring of the upper surface, is *Eudamus lycidas*. It is a little



UPPER SIDE



UNDER SIDE

EUDAMUS TITYRUS

smaller than *Eudamus tityrus*. The general color is dark brown, with a number of angular, translucent, yellowish spots on the fore wings. The fringe along the outer edge of the fore wings is yellowish-brown, interrupted with black dots, that of the lower wings being gray with black points. The body is brown. The lower side of the



Eudamus lycidas. Under side.

butterfly is in strong contrast with the upper. The upper wings are mottled brown, lighter toward their lower margin, with a large black patch occupying the upper part of the wing next the body. A large, single yellow spot takes the place of the yellow spots seen from the upper side. The lower wings have a large black area, bordered



Eudamus pylades.

above and below with brown, and enclosing two or three brown spots. This occupies the upper half of the wing next the body. A patch of brown, fringed with black, occurs at the lower angle, the rest of the wing being white, streaked with fine brown markings, thickest toward the upper part. The brown of the lower wings is streaked

with darker brown. The body below is almost black, and the palpi are gray. The habits of this insect are very like those of *Eudamus tityrus*, but according to my experience, it is a much rarer butterfly. I have never seen it abundant, although I have specimens from Massachusetts, Washington, D. C., and Arkansas.

Eudamus pylades is a sooty brown butterfly, with a number of small angular light spots distributed over the outer half of the forward wing. The body is darker brown than the wings. The larva feeds on clover, and the perfect insect comes forth in June. It is an inhabitant of all but the most northern part of the United States.



Eudamus bathylus.

Eudamus bathylus is a very similar insect in color and shape to the preceding, except that the yellow spots on the fore wings are much larger and more distinct. It is more southern in its range of territory. I have specimens from Virginia and Arkansas.



Ancyloxypha numitor.

A little species, belonging to this same family, but differing much in shape from those already described, is *Ancyloxypha numitor*. In this butterfly the head is wide and large, proportionally, but the

thorax tapers backward, and the abdomen is thin and long, contrasting greatly with most of the skippers. The antennæ are knobbed but not pointed. The upper wings are yellowish-brown with a wide black margin. The lower wings are lighter or tan color with a heavy black border extending along the upper margin around to the inner angle and are fringed with yellow. This is a very common butterfly in August over the eastern half of the United States. It is fond of open fields, and the second crop of clover is a favorite with it.

LYCÆNIDÆ.

Blues, Coppers, Hairstreaks.

A large number of frail but lovely little creatures comprise the great family *Lycenidæ*. Most of the species belonging to this family are small, our largest being about two inches in expanse of wing. The antennæ are knobbed or clubbed, but not pointed as in the family of *Hesperidæ*, and the knob is straight. The wings are frequently delicate in structure and are large and flat in proportion to the body, which is slender. The thorax in a few species is robust but is generally slight. All six legs are well developed and are used in walking. The family is a very large one and insects belonging to it are to be found in almost every land. The beauty of some of the species is most extraordinary, comprising almost every conceivable color and shade. Many of them are metallic blue, while others are green, purple, red or golden, and some a combination of these. A number bear on the lower wings curiously shaped tails. Were these slight butterflies of large size some of them would rival the gorgeous *Morphos* and the regal *Papilios* and *Ornithopteras*. They are to my mind among the handsomest objects in nature. Some of them haunt open grassy fields and meadows, others delight in low shrubbery on the outskirts of forests, and still others prefer the woods and will often congregate in numbers in sunny open spaces among the trees. The flight of some, especially the more delicate, is slow and unsteady, while others are swift flyers; but their flight is not usually long sustained. Their flight is generally low, and consequently they are easily taken with the net. When they alight their wings are most often closed tightly together over the back, and some have a habit while at rest on a leaf or flower of working each of the lower pair of wings alternately up and down. This habit, strange as it

may seem, has gone round the world, and when one is collecting perhaps on the other side of the globe he will see species allied to those so well known in his native land, as they alight on the tropical foliage go through the same antics. One is apt to exclaim, "Dear me! where did that little butterfly learn that trick?" A fact like this is very likely to set one wondering how such a habit is transmitted and also why it should be so persistent in travelling so far.

The larvæ of these butterflies are interesting from the fact that they are slug-like in their form and movements, their abdominal legs



Larva of *Lyceena*.

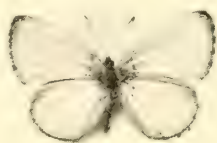
being so short that they cling very closely to their support and glide rather than crawl. In this respect they resemble the larvæ of *Limacodes* among the Bombyx moths. They also somewhat resemble wood-lice, the head being small and capable of being retracted beneath the folds of the first thoracic segments. The body is not adorned with tubercles and filaments as in most of the larvæ of *Limacodes*. Some of the species are said by Professor Comstock to possess honey tubes through which honey dew is extracted for the use of ants. Many of the caterpillars are green in color and feed on the leaves of forest trees, oak being a favorite food plant. One of our native species is carnivorous in the caterpillar stage and feeds on plant-lice. A few of the larvæ are downy, but they are usually naked. The chrysalis is short, broad and thick and is convex on the back, rounded at both ends and flat beneath. It is attached by the tail to a silken mat and has a band of silk about the middle, holding it closely to the substance to which it is fastened. The *Lycenidæ* may be readily separated into three groups, the "Blues," including many blue, purplish and bluish-brown insects; the "Coppers," in which many of the species are copper-red or brownish-red; and the "Hairstreaks," wherein a large number bear tails and are of various colors, often ornamented with fine streaks of color beneath. The United States are rich in insects belonging to this family, the mountain regions of the Pacific coast being particularly so; while some of the most beautiful inhabit the valleys and table-lands of Colorado, Arizona and New Mexico.

LYCÆNA. *Blues.*

The "blues," or the genus *Lycæna*, is well represented in this country, but the bulk of the species inhabit the Pacific coast where a large number of the finest insects of this genus are to be found. These butterflies are frail, delicate creatures, the body being weak, the wings large and wide in proportion. The coloring of the upper side of the wings in most species is satiny blue, others being bluish-purple and purple-brown. The under side is generally light gray with more or less distinct brown or blackish markings. There are about fifty species of these butterflies inhabiting the United States, but only a few of them occur east of the Rocky Mountains. To one who has collected in New England or the western states the number of species and individuals of this group to be seen in the mountain valleys of Nevada and California is something long to be remembered with delight. They are most abundant in the spring and early summer, when the valleys are bright with wild flowers and before the long and severe summer drouth has turned the fertile land into a brown and barren desert. Near Washoe, Nevada, at the eastern base of the Sierra Nevada, my brother one season made an extensive collection of species of this genus and the *Chrysophanus* and *Thecla*. They are very plentiful in the Yosemite valley in June, and at that time the wild flowers are peopled with them. We have but two common species of this genus in the east, although two or three others occur rarely in the middle states and several in Florida.

Lycæna pseudargiolus is our best-known species, as it is everywhere abundant in early spring, and is on the wing soon after the snow disappears from the woods. This insect has many well-marked varieties, some eight or ten of which have been described and named, entomologists supposing them to be distinct species. A remarkable thing about these varieties lies in the fact that they are frequently local, having boundaries as distinct as well-marked species, and while the insect in general inhabits a large part the United States and Canada, extending also up into Alaska, certain varieties are often much more restricted. Another curious fact connected with this and several other kinds of butterflies is that the insects emerging from chrysalides which have hibernated over winter are different from their parents, which were the summer brood of the year before. Without going too much into details two or three of the well-marked varieties will be given with descriptions.]

In the early spring form, probably most numerous throughout the country, the upper side of the male (Fig. 1) is a rich satiny or azure



Lycaena pseudargiolus.
Fig. 1. Male.

blue, deepest near the base of all four wings. The upper wings are margined outwardly with a narrow shading of blackish, widest and heaviest at the apex of the wing. The lower wings are edged on their outer margin with a narrow, dark line. Both pairs of wings are fringed with gray, darker toward the apex of the upper wings, and interrupted on both wings with black dots. The body is black. Insects with these colors above have at least three varieties



Lycaena pseudargiolus. Under side.
Fig. 2. Male.

where the colors beneath differ. Fig. 2 is light gray beneath, having a row of light brown dots along the outer margin of all four wings enclosed on the inner side with a scalloped line of the same color. An irregular row of dark brown spots cross the upper wings near their outer margin, the remainder being plain gray, slightly darker along the upper margin. A number of black spots are scattered over the lower wings. The thorax is light gray, the abdomen nearly white. In Fig. 3 the under side is bluish-gray, darker than Fig. 2.

The spots on the outer margin of the wings are very faint, fading out on the upper wings, and outside the scalloped line is a band of brown-



Lycæna pseudargiolus. Under side.
Fig. 3. Male.

ish-gray lighter toward the apex of the upper wings. The row of spots on the upper and the scattered spots on the lower wings are not so sharply defined, but are larger than in Fig. 2. The thorax



Lycæna pseudargiolus. Under side.
Fig. 4. Male.

is darker gray and the abdomen is white. Fig. 4 is still stronger marked; the gray is a little darker than in Fig. 3. Outside the scalloped line along the outer margin of the wings is a wide band of brown enclosing black spots on the lower wings. The row of spots on the upper wings are heavy and make a continuous line. On the lower wings the scattered spots have widened until they have coalesced, making a large patch of brown on the middle of the wing. The thorax is dark gray, the abdomen white. The typical female form is shown in Fig. 5. The wings are satiny blue, somewhat darker than in the male. Along the outer margin and extending half-way along the upper edge of the upper wing is a wide band of black, strongest at the apex. The upper edge next the body is

light gray. The lower wings are fringed with white interrupted with black spots. Along the outer margin is a row of small black



Lycæna pseudargiolus.
Fig. 5. Female.

spots. The thorax is black, the abdomen dark gray. The under side of the female is shown in Fig. 6. The wings are gray, darkest

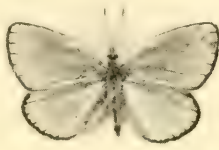


Lycæna pseudargiolus. Under side.
Fig. 6. Female.

next the body. Heavy blackish spots adorn the wings and a wide border of blackish-brown scalloped on the inside follows the outer margins. The specimens described and figured were all taken early in the season near my home.

A specimen from Haverhill, Massachusetts, is somewhat larger than those first described. It is like the ordinary variety above except that the lower wings have a large very light area in the middle. Beneath, it is very light gray with small distinct lines and spots. A variety sent me from near Toronto, Ont., is large and beautiful. In the male insect (Fig. 7) the upper side of the wings is rich shining purple with a narrow line of black edging the outer margin of all four wings. Outside of this is an uninterrupted white fringe. The body is bluish-gray. The under side (Fig. 8) is a much darker gray

than those already described. There is a row of shining blue spots along the outer margin of the lower wings, and above these a band of



Lycæna pseudargiolus.
Fig. 7. Male.

ochre edged internally with a line of black crescents. The other spots on the wing are black, except a double row along the outer



Lycæna pseudargiolus. Under side.
Fig. 8. Male.

margin of the fore wings which are dark gray. These spots are all edged with light gray. The female of this variety (Fig. 9) is very



Lycæna pseudargiolus.
Fig. 9. Female.

different from those already mentioned, being dark brown with a purplish area on the lower half of the upper wings, the same purple

extending in a band, widening as it crosses the lower wing from the base to the lower margin, where it occupies nearly the whole width of the wing. A row of black spots extends along the lower margin of the lower wings, partly enclosed on their inner sides with orange-colored half-moon spots, which fade out as they approach the upper margin. A narrow black line extends along the outer margin of the upper wings and is continued along the lower margin of the lower pair. Both sets of wings are fringed with gray scales. The body is black.

These little butterflies are slow flyers, keeping not far above the ground, and are usually most abundant on the outskirts of woods. They love to congregate about damp places on the ground to sip the moisture. With care one may approach closely and even take them by hand. The coloring of the male when freshly hatched is very pleasing and is almost the exact tint of the horseshoe violet which blooms at the time when this butterfly is most numerous, the flowers and insects being often found near one another. There are two or more broods of these butterflies in a season. The larva is usually light green with brown markings, but pinkish or chocolate-brown specimens sometimes occur. It feeds on the buds and flowers of several plants, dogwood and rattle-weed being favorites. The chrysalis is brown with two rows of brown dots down the back of the abdomen.



Lycaena comyntas. Male.

One other common species of this genus is *Lycaena comyntas*. The male is dark violet, the upper wings with a narrow band of blackish-brown along their outer margin, the upper and lower margin of the lower wings being the same color. The lower wing has a black thread-like tail with a white tip. This will readily distinguish it from the preceding tailless species regardless of the varieties it may assume. Along the lower margin of the lower wing is a row of black

spots, the largest one just above the base of the tail having an orange crescent above it. These black spots are outlined on the outer side with a faint white line. The thorax is bluish-black, the abdomen



Lycaena comyntas. Under side.

brown. The under side which is similar in both sexes, is very light gray. A number of dark gray dots are arranged in rows on the outer third of the upper wings, and a row extends along the lower margin of the lower wings, the two nearest the lower angle being partly enclosed with orange crescents. Other spots of gray are scattered over the wings, and most of them on both wings are outlined with white. The legs and thorax are light gray and the abdomen white. The



Lycaena comyntas. Female

female of this species is blackish-brown with purple reflections in a strong light. A faint white line extends along the lower margin of the lower wings and two distinct black spots are located above near the base of the tail. The spots are partly surrounded above with two crescents. The body is black.

This tiny butterfly makes its appearance in the latter part of July and the first of August, and is usually to be met with in abundance about forest clearings or bushy pastures. It is a weak little creature, seldom flying more than a few feet at a time. It is very fond of the

flowers which bloom at the time of year it makes its appearance, and is often so interested in its repast that it may be collected by hand. Mr. Harris says that the caterpillars live on *Lespedeza*, and that they are oval, convex and downy, of a pale green color with three dark green lines, the sides of the body reddish and the head black. The chrysalis, which is usually fastened to a leaf, is at first pale green, but becomes darker afterwards. It is sparingly clothed with whitish hairs and there are three rows of black dots on the back. The chrysalis state lasts from nine to eleven days. This butterfly is found in nearly all parts of the United States.

CHRY SOPHANUS. *Coppers.*

The insects belonging to this genus can generally be separated from the other members of the family by the copper-red, orange-red or brownish-red colors of most of them. Conspicuous brown or black spots usually adorn the wings, both upper and under side. Our most numerous species of these little butterflies inhabit open fields and meadows and are sometimes exceedingly abundant. Our most common butterfly of this genus and probably the most common butterfly to be found in New England and the middle states during May and again in August is *Chrysophanus hypopleas*. It is very partial to open fields where buttercups and sorrel abound, and the blossoms are literally alive with this pretty little insect during its greatest abundance. At evening they alight on the stems of grasses and weeds with their wings tightly closed, and one may go about after sunset or early in the morning and pick them off with the fingers. During the cool morning while the grass is covered with dew they remain quietly suspended from the stems and leaves of plants and will not readily take wing. One advantage of this mode of collecting is that one need take only perfect specimens, and those taken if put at once into papers are not liable to be injured. Two or three different varieties of this butterfly are to be found by diligent search. In one the black spots of the forward wings are almost or wholly wanting. This variety has been taken in some numbers about Cambridge, Massachusetts. In contrast with this is a dark variety, where the black spots of the upper wings are very much widened and elongated beyond the normal, covering a good part of their surface.

These varieties are not numerous, but one may find them by collecting large numbers of specimens. In five hundred specimens of



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CHRYSOPHANUS HYPOPHLEAS

this species collected in Wellesley, Massachusetts, during May of 1897, I took no very striking varieties of any kind, but in the same year during August I collected five hundred more, with the result of obtaining half-a-dozen well-marked specimens of the dark variety, but not one of the light. Whether this is a sufficient number to give an idea of the percentage of such variations I cannot say, but one would infer from this that the second brood is much more liable to



Chrysophanus hypoplæas, var.

variation than the first, and that the light variety with almost no spots is of much rarer occurrence than the dark variety. In some of the dark variety the black almost covers the entire wing, making the insect look like a totally different species. The caterpillar of this butterfly is longer and narrower than is usual with the larva of butterflies of this family, is covered with hairs, is reddish, pinkish or greenish in color and feeds on the common sorrel. The chrysalis is short and stumpy, like that of most of the species of the family.

Mr. Packard says of the chrysalis: "The head and thorax, including the wings, is dull reddish-brown dotted with black. The abdomen is much lighter with very distinct and irregular black dots. The chrysalis is usually suspended under a stone." There are two or more broods in a season. The geographical range of the species is wide, being found along the Atlantic coast southward, throughout the middle states and through Canada, west into Washington and in California. A very closely allied if not the same species occurs throughout Europe.

Our largest and handsomest species of this genus is *Chrysophanus thoe*, and an exceedingly fine butterfly it is, an ornament to any cabinet. The insect expands from an inch and a half to two inches or more, the female being usually somewhat larger than the male.

The upper wings of the male are a beautiful bronze-brown, having

a purplish or pinkish sheen overspreading them, strongest toward the outer margin, with a brassy look nearest the body. Along the mar-



Chrysophanus thoe. Male.

gin is a band of dark brown, and several spots adorn the middle of the wing, varying in intensity from black to a very faint brown. Two rows of faint brown spots cross the wing on its outer portion. The lower wings are darker than the upper pair, the purple reflections extending over the upper half only. The wings are scalloped along their lower edges, the points and margin being black, while between these black points is a white fringe. Above the black margin and connected with it is a row of roundish black spots, the one nearest the lower angle of the wing being double. Above this



Chrysophanus thoe. Under side.

row of spots and partly enclosing them is a band of orange, widest near the angle and narrowing to crescent spots at the top. A single almost black line is placed above the centre of the wing. The body is black, the antennæ are black tipped with orange, and like many of the species of this family, they are crossed by numerous fine white



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CRESOPHANUS THOE

lines. The under side is much lighter than the upper. The upper wings are light rust-red, still lighter toward the lower margin with gray fringes and a light gray area at the apex extending half-way down the outer margin. In this gray area are fine, nearly white spots. Numerous black spots are scattered over the wing. The lower wings are light gray, nearly white along their inner margin. Along the outer margin is a black line bearing black points. A wide orange band occupies the lower part of the wing and many black spots outlined with white or very light gray look as if scattered at random over the wing. The body, legs and palpi are white. The female differs from the male in having a large, dull orange spot occupying the middle of the upper wing, which has a wide blackish-



Chrysophanus thoe. Female.

brown margin, the rest of the wing being brown without the purple reflections. The spots on the wings are large and black. The lower wings and the under side of both wings much resemble those of the male insect. Although I have never seen this butterfly at all numerous in comparison with the preceding species, it is not rare in the middle and western states. It is usually to be found on bushy or weedy tracts, especially along rivers or railroad embankments. It frequently alights on the low weeds which spring up on the sandy bars covered by high water, and here it may be seen in July or August days, resting with the wings half-spread or chasing other insects about in the hot sunshine. It is not very shy nor a swift flyer, so that one may often take it with the net while on the wing. When disturbed it flies but a short distance, and alighting closes its wings, remaining motionless to escape observation. The larva feeds on dock and there are two broods in a season, one usually in May

and the other in August. This insect ranges from New England, where it is rare, through the middle and western states to the Rocky Mountains.

The habitat of a certain insect is sometimes so restricted and its favorite haunts so few and far between that one may dwell within no great distance of it for a long time without knowing of its existence. Many of the tiny creatures such as we are considering are shy and retiring, shunning man and his habitations and never intruding themselves upon his notice. A good many of the butterflies belonging to this great family of *Lycenidae* have to be carefully and diligently searched for, and a collection containing a large number of our native species carefully collected and neatly mounted represents a good deal of painstaking labor both in the field and in one's home. Our next example, *Chrysophanus epixanthe*, is such a *little* creature, its colors blend so readily with its surroundings and its habitat is so restricted that it has been considered by some collectors a rare insect. It delights in low swampy districts where grasses, cranberry vines and low bushes cover the ground, and in a swamp perhaps many acres in extent, one part apparently like another, it may be confined to a few square rods of grassy and bushy water-soaked land. Such a locality I know not far from my home, where, early in July, one may go with



Fenisea tarquinius.

the prospect of finding this little butterfly moderately abundant. It is difficult to see when at rest on a grass stem as the color of the under side of the wings, which are usually closed, is about the same as that of the yellow, dried stems and leaves of the previous season's growth. The butterfly is not shy and its flight is slow and weak. When disturbed it rises but a few inches above the grasses and flying a few feet alights. When freshly hatched from the chrysalis the rich iridescent brownish-purple of the upper side of the wings makes it a

beautiful little creature. I have never found well-marked varieties of this species such as occur in *Chrysophanus hypophleas*. This butterfly is found throughout New England and the western states.

A remarkably interesting though usually rare butterfly is *Feniseca tarquinius*. The upper wings are heavily bordered with black with a wide, irregular orange patch containing two black spots occupying their central portion. The upper half of the lower wings is black, the lower half orange with a row of irregular black spots along the lower margin. The body is blackish-brown. The under side is very differ-



Feniseca tarquinius. Under side.

ent in coloring. The upper wings above their upper and outer margins have a wide band of light rusty-brown. The lower margin of the wings is gray, while the interior portion is light orange. Four angular dark reddish-brown spots, very small next the body and growing larger toward the apex of the wing, are placed along the upper margin. Two black spots and a line running toward the base of the wing occur farther down. The lower wings are reddish-brown, lighter toward the lower margin, and almost the whole surface is covered with reddish-brown spots edged with gray. The markings vary somewhat in different specimens, sometimes the black and again the orange predominating. The body and legs are light gray. Although this insect inhabits almost the whole country east of the Rocky Mountains I have never seen it abundant. I once took a dozen or fifteen specimens early in June along the road leading from Jackson, New Hampshire, to Mount Washington. They were at rest near puddles of water in the road, and one or two were settled on horse dung. I found them exceedingly shy and very rapid on the wing. Their colors are such that unless one kept his eye constantly on the alert he would scarcely see one at all, much less catch one in a net while on the wing. When disturbed they would fly into

the woods high up among the branches of the trees and would soon be lost to view. I found by walking very slowly over the road and carefully scanning every wet place and every heap of dung, I could see these shy, alert creatures before they became frightened and took wing, and in this way procured a good number. Sometimes while I was approaching stealthily what looked like a tiny line of brown on the road a butterfly of some other kind would sail past and away would go my intended prize after the new comer, chasing him perhaps several rods down the road. I found if I remained standing quietly by he was very likely to return soon. The place where these butterflies were to be seen did not occupy over a quarter of a mile of the road, and I found them in the same place when returning from the mountain a week later. The most interesting thing in connection with this butterfly is that the larva is carnivorous (a very unusual thing among the *Lepidoptera*) and feeds on the colonies of woolly plant-lice inhabiting the alder. The larva, according to French, is green with three white stripes down the back. Besides the specimens mentioned taken in New Hampshire, I have one from Wellesley, Massachusetts, and two from Gainesville, Virginia.

THECLA. *Hairstreaks*.

The large genus *Thecla*, the "Hairstreaks," next engages our attention and in the eastern half of our country is well represented. While we have no members of this genus to equal in coloring some of the resplendent creatures which inhabit the hot valleys of the Andes or rival many from Mexico or Central America, still we have a number that are both interesting and beautiful. Many of the species of this genus have one or more delicate prolongations or tails to the lower wings. These in some of the tropical insects of this group are long and curved and add much to the beauty and oddity of the specimens. The males usually have a dark oval patch of color near the upper margin of the upper wings. This is generally quite distinct and easily seen. Most of our native species are of different shades of brown with fine lines and markings beneath and with bright patches of color, strongest on the under side near the inner angle of the lower wings. In some species the thorax is strong and stout, furnishing powerful muscles to work the usually short wings. Many of these insects are swift flyers although they do not generally make long flights. They are usually most abundant on the edges of forests,



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CHRYSOPHANUS EPIXANTHE

and the sweet-smelling flowers to be found in such localities are a great attraction to them. About twenty species are native of the eastern half of our country.



Thecla halesus.

One of our most gorgeous insects belonging to this genus is *Thecla halesus*, and when gazing on its rich and brilliantly colored wings, one can hardly believe it is other than an inhabitant of tropical countries.

It is rather stout-bodied. The upper wings of the male are intense shining blue changing to purple or greenish according to the light in which it is held, with a heavy black band extending along the outer margin and for a short distance along the upper margin near the tip of the wing. A large black sex mark is located just below the middle of the upper edge of the wing. The lower wings are also blue, with a wide black patch at the upper angle and a wide band of black shading into greenish gray towards its upper part, on the inner margin. There is one long pointed tail on each of the lower wings, with a very short one scarcely more than a point just above it. Near the base of the long tail is a shining metallic greenish spot changing to bronze toward its inner end, and also a little spot of the same color near the base of the little tail. The head is black, with three silvery dots above and two silvery lines along the base of the palpi. The antennæ are of the same color; the body a brilliant shining blue shading to black toward the tip of the abdomen.

The female is usually larger than the male, and much more sombre in coloring. The most striking difference, however, is in the tails or delicate prolongation of the lower wings. The upper pair are of moderate length, and about what one would expect in a butterfly of

this size. The lower pair however, are very long and slender, and out of all proportion to the size of the wings. On this account, and the size of the insect, none other of our native butterflies are at all



Thecla halesus. Female.

likely to be confused with this species. The upper wings are sooty black on the outer two-thirds of their area, the inner third being a dull metallic greenish blue, blending into the black. This coloring also extends diagonally across the lower wing from the body to near the base of the tails. Two elongated blue spots and one nearly round bronze spot are enclosed in a black area near the base of the tails. The tails are black.



Thecla halesus. Female. Under side.

The under side of the wings of both sexes is much alike. The upper are brown, slightly lighter on the lower half, with two white dots and one orange red spot near the base of the wing. A black

fringe extends along the outer margin. The lower wings are slightly darker brown than the upper pair, sometimes having a delicate violet tinge on the upper portion. Near the base of the wing are several white dots and two orange red spots. An area about the lower angle of the wing is black, and the tails and the fringe along the outer margin are also black. A row of metallic violet or purple blue spots extends along the lower margin of the wing, just inside of the black fringe and above the base of the tails. Two rows of shining green spots, the lower row ending in a long spot of bluish purple next the inner margin, extend nearly across the wing in its lower portion and separate the brown from the black area. The head, thorax and legs are black with numerous fine white dots, and the abdomen is orange red tipped with black.

This handsome butterfly is an inhabitant of the southern states and Mexico. It is occasionally taken as far north as southern Ohio and Illinois, and westward in California. It is not a rare insect in Florida early in March, my brother having seen and taken specimens near Jacksonville in that month. It is a strong and rapid flyer, frequently alighting, but rather shy, and difficult to take with the net. In Florida it is to be found in sandy districts on the edges of forests. It frequently circles about the trees and when frightened flies up and alights on twigs high up out of reach. I have several fine specimens from Tennessee which are at least a third larger than those taken by my brother in Florida. It is from these Tennessee specimens that the illustrations are made.

The larva I have never seen and know nothing of its habits. It is said to feed on the leaves of the oak.



Thecla smilacis.

A rather rare *Thecla*, and one which differs in a striking manner from our other native species, is *Thecla smilacis*. It is a double-tailed species, the upper pair of prolongations being exceedingly fine

and hair-like, and showing at a casual glance scarcely more than a point. The lower tails are larger and longer. There is some difference in coloring between the sexes, the female being usually plain brown in color, while in the male the middle of each wing is tawny or rusty with a border of dark brown. The tails are black, tipped with white, and the body is dark brown; but the distinguishing characteristic is the color of the under side, which in both sexes



Thecla smilacis. Under side.

is green. In the upper wings the green color is most intense near their base and at the tip, the lower half of the wing being rusty brown. Two rows of white dots, internally edged with reddish brown, cross the upper wings, fading out toward the lower margin of the wing. The lower wings have three bands of white, the inner one next the body being short and composed of three white spots edged externally with rusty brown; the middle one extends in a wavy line across the centre of the wing, and is composed of large white spots, having spots of rusty brown on the inner side; the outer band is narrow and follows the outer margin of the wing, being edged internally with gray and externally with dark brown. A small black spot is located at the end of this line, just at the inner angle of the wing, and has a white crescent above it. Between the outer and middle white lines are two very small crescents of black, the lower one having a faint orange spot below it with a black dot below that. The body and legs are gray. I have never seen this insect at all abundant and have taken it on but two or three occasions near my home in Massachusetts. It is a difficult little creature to see when at rest on the shrubs and bushes, among which it delights, and when disturbed it flies in such a rapid and jerky manner that the eye can scarcely follow it. I have taken it early in June flying about scrub oaks and young cedars, and am inclined to think the larva lives on the latter plant, although

I have never been so fortunate as to find it. The species inhabits most of the country east of the Rocky Mountains and south of Massachusetts.

A very delicately and prettily marked little butterfly is *Thecla pœas*, an inhabitant of the southern and southwestern states. The upper wings are sooty black, with no markings whatever in the ordinary form except that the upper edge of the wing is red, although a specimen is occasionally taken with a few blue scales



Thecla pœas.

scattered near the base of the wings. The lower wings are also black, with a conspicuous wedge-shaped blue patch extending from the base to near the lower margin, widening as it advances. Two black spots are located near the base of the tails, with a fine grayish blue line below them. In this species, as in most of the butterflies of this genus, the lower pair of tails is the larger. Both pairs are



Thecla pœas. Under side.

black, tipped with white. The body is black. The under wings are grayish brown, lighter toward the lower margin of the upper wings, the red upper edge of the upper margin showing more distinctly from below. A reddish orange band composed of nearly square spots placed close together extends two-thirds across the upper wings, beginning at the outer third of the upper margin. This

band is edged externally with a very narrow line of black, and outside this is another line of white. A line of faint dark spots fading out toward the upper margin may be traced between the strongly colored orange band and the margin, and a single elongated spot is located above the centre of the wing. On the lower wings the band of reddish orange spots, similar to the one on the upper wings, extends in a zigzag manner across the wing. Between the base of the tails is a large black spot with an orange crescent above it. A small black spot with two vague white spots above it is located at the inner angle, and between this and the large one is a blue gray spot. A fine black line extends along the lower margin with a delicate white line above it. There is also a line of faint dark crescents, the lower one having an orange line externally, extending from the large black spot to the upper angle of the lower wing. The thorax and legs are gray, the abdomen whitish.

In Florida and the Gulf states, this butterfly is generally not rare in February and March, and may be taken in the same localities inhabited by *Thecla halesus*. It is not wild and may be captured in the hands if caution is exercised. When frightened, however, it can fly rapidly, but after circling about for a few moments soon alights, often returning to the spot which it occupied before it was disturbed.



Thecla calanus.

Probably our most common species of this genus is *Thecla calanus*, and although I have never seen it in any such numbers as one may often see species of our commoner butterflies, still in favored localities it is sometimes abundant. The upper side of the wings is dark blackish brown, the male having the usual oval disc near the upper margin. There is one moderately long tail and an exceedingly fine and short one. Both are black and tipped with white. Near the base of the tails, and extending to the inner

angle of the wing, is a narrow black line edged on both sides with a faint white line. There is a black spot at the inner angle, and a dim orange red spot edged externally with black above and between the base of the tails. The body is of the same color as the wings.

The under side of the wing is lighter than the upper. Two lines of elongated dark brown spots, close together, cross the upper wing. The outer line is very faint, both above and below the middle, edged internally with white; the inner line is more distinct, and is edged externally with a fine line of white. One dark brown spot is situated above the middle of the wing, and is edged



Thecla calamus. Under side.

on both sides with faint whitish lines. On the lower wings the two lines of spots are continued, but the outer one is much more distinct than the inner, being composed of black crescents edged internally with white. This line is very irregular and runs in a zigzag manner above the base of the tails. The inner line is edged externally with white, as on the upper wing, both lines curving upward toward the end of the abdomen on the inner margin. There is a conspicuous black spot between the base of the tails and another at the inner angle. A fine white line runs from the latter spot along the outer margin and fades out toward the upper angle. A large blue gray spot is placed between the two black spots. A large deep orange crescent with a smaller one placed farther upon the wing will be seen above the first black spot, and an orange line is located above the black spot at the inner angle. The thorax and legs are blue gray, and the abdomen is whitish with brown at the tip.

In the latter part of June and early July this butterfly makes its appearance in the northern part of this country. It is not at all shy or wild, and when settled on its favorite flowers may be picked off

with the fingers. Like many other insects it is very partial to the blossoms of the different kinds of milkweeds, deliberately moving about over the clusters of flowers and extracting their honey, paying not the slightest attention to the bees, wasps, beetles and flies that usually swarm about these strong-smelling blossoms. One of my brothers had the good fortune early in July to find a locality in Concord, Mass., where this and two or three other species of *Thecla* were very abundant, and where he obtained a large number in a short space of time. They were first seen on the roadside, but on entering the scrub an open space was found, of perhaps half an acre in extent, in which many plants were in bloom. On the flowers rested dozens of specimens of this and the following species, most of them in very perfect condition. Specimens of *Thecla titus* were also seen and captured, but they were very wild and had to be approached in the most careful manner. The finding of such a locality as this is a veritable mine to the collector, who may here lay in a supply of perfect specimens with which to exchange with other collectors for their duplicate specimens. One gentleman with whom I am acquainted, living not far from my home, has in this way obtained a very fine collection numbering many hundreds if not thousands of both native and exotic butterflies and moths, never having procured a specimen except in exchange.

The larva of *Thecla calanus* feeds on the oak. The species inhabits the eastern half of the country, except the extreme south. It also runs well up into Canada.



Thecla edwardsii.

A closely allied insect, inhabiting the same localities and easily mistaken for the preceding species, is *Thecla edwardsii*. This butterfly also has two tails, although the upper pair are scarcely more than points. The general color of the upper side is not so dark a brown as in *Thecla calanus*. There is the same black line along the lower margin of the lower wings, edged with white. Above and between

the base of the tails is a tawny spot, which in some specimens is prominent and in others is so dim as to be scarcely noticeable. The under side is lighter brown than the upper, the spots arranged in two rows on both sets of wings much the same as in the preceding, except that they are farther apart and the white lines encircle the brown spots on the inner row, although they are much more prominent on the outer side. Several crescents of deep orange, edged internally with black, extend from the base of the lower tail to within a short distance of the upper angle in the lower wing, and a large blue spot is located between the base of the lower tail and the inner angle, where there is a black spot.



Thecla edwardsii. Under side.

The tails are black, tipped with white, and a small black spot, with a point in the middle extending upward, is located above the base of the tails. A fine black and white line follows the lower margin of the wing from the black spot at the lower angle to the upper angle. The thorax is gray, the legs nearly white, and the abdomen light brown.

This butterfly, although usually less abundant, inhabits the same localities and may be taken at the same time as the preceding species. The remarks as already written in regard to the habits of one apply equally well to the other.

Another double-tailed species, which I have found rather rare and difficult to obtain in perfect condition, is *Thecla strigosa*. The upper side is dark brown, and in the female a large patch of tawny orange occupies the middle of each fore wing. This spot is almost if not wholly wanting in the male. A faint tawny spot with a black spot below it is placed between the base of the tails in the lower wings, and a black line edged with a faint line of white extends from the base of the upper tail to a black spot at the inner angle. The tails are black, tipped with white. The body is dark brown. The under

side is prettily marked with wavy white lines, the outer line of both wings being edged externally with black crescents. A black spot is situated on the lower wings between the base of the tails, and another



Thecla strigosa.

one at the inner angle. Between these two is the usual blue gray spot. A row of orange red crescents, gradually becoming smaller toward the upper part, extends above these spots from the inner



Thecla strigosa. Under side.

angle toward the upper angle of the wing. The thorax is gray, and the legs grayish white, the abdomen being yellowish white. Packard says that the larva is downy and of a rich velvety green, obliquely striped on the sides with faint yellow lines, and that it feeds on the thorn.

I have captured a few specimens of this butterfly in Massachusetts late in July, and have had others sent me from Canada. This insect inhabits the eastern half of the country. Those that I found were among low shrubs and bushes and often in company with *Thecla calanus*, though they were much more shy, and when alarmed flew rapidly away and were seldom seen again. The white lines on the under side render the insect quite easily identified from the other butterflies with which it is likely to be found, and one may move cautiously about where they are feeding or

sporting in the sunshine, and pick out the kinds which are most desired.

Still another of our native double-tailed insects belonging to this genus and inhabiting all the upper part of the eastern half of the country is *Thecla humuli*. The upper side is sooty brown, sometimes blackish or bluish, particularly on the lower wings. The upper wings have no marks of any kind except the usual sex mark in the males. The lower wings have two delicate tails on each, the lower pair being much the longer. These are black, tipped with white. Between the base of the tails is a black spot, and above this a large, orange red crescent. Two or three dim bluish spots are located between this orange crescent and the inner angle of the wing. A narrow black line, edged internally with a faint whitish line, runs from the base of the upper tail to near the inner angle, where there is usually a



Thecla humuli.

faint orange spot. The eyes are brown, the front part of the head white, the thorax and upper part of the abdomen bluish black, the latter tipped with reddish brown.



Thecla humuli. Under side.

The under side of the wing is a delicate light grayish brown. The upper margin of the fore wing along the inner half is tinged with red, and two lines of blackish spots are placed on the outer third of the wing. The outer line is faint, and fades out completely at

both ends before reaching the upper or lower margin; the inner line is composed of more distinct spots, and extends from the upper margin half-way across the wing, where it abruptly ends. These spots are edged externally with white. These two lines of spots cross the lower wings, approaching each other closely where they end at the inner margin. At the inner angle is a distinct black spot, and another one is placed above and between the base of the tails. Conspicuous orange spots, with a gray one between them, are located above these black spots. A narrow black line, edged internally with white, extends along the outer margin from the spot at the inner angle to the upper angle of the wing. The body and legs are light gray, almost white.

This pretty little butterfly is not rare in July and August, and may frequently be found about flowering plants at that time of year. According to my observations it is most abundant along the borders of lakes and rivers, but this is doubtless because the flowering plants from which it extracts honey are, in our cultivated districts, only allowed to grow freely in such places. The larva is green and downy, and may be found feeding on the hop vine. It is found in all parts of the country.



Thecla titus.

Thecla titus is a handsome tailless species, having a range over the country east of the Rocky Mountains, extending north into Canada. The upper surface is dark brown with brassy reflections, the body being blackish with a slightly green shade. The upper wings are without markings, except a grayish oval sex mark near the upper margin in the male. On the lower wings a fringe of white hairs extends along the inner margin from their base, half-way to the inner angle. A faint whitish line, edged internally with black, runs from the inner angle a short distance along the outer margin. On the under side the wings are somewhat lighter with more of a red-

dish cast, next the body being slightly greenish, but lacking the brassy reflections of the upper side. A row of small black spots, edged externally with gray, run more than half across the upper wing from the outer third of the upper margin. A row of three or four minute black dots are placed between this row and the outer margin. On the lower wings is a row of bold, orange red spots, edged internally first with black and then with white, extending from the upper margin near the upper angle to near the inner angle. A narrow black line runs from the inner angle along the outer margin, growing fainter toward the upper angle. A straggling row of black dots, edged outwardly with white, partly cross the wing beginning about the middle of the upper margin. The thorax is bluish gray, the legs whitish. The abdomen is yellowish white, but brown at the tip.

A more agile and wary little butterfly than this it would be difficult to find. While on the wing it moves so rapidly and darts about in such a manner, that one can hardly keep it in sight.



Thecla titus. Under side.

It is frequently to be met with in July, on flowering weeds in company with other kinds of *Thecla*, but one must move cautiously and strike quickly with the net to capture it. While in pursuit of the different species of *Argynnis* along the meadows, I have occasionally run across this butterfly, but have never seen it very abundant. French describes the larva as dull green in color and covered with very short brown hairs. It feeds on wild cherry and plum. Inhabits the greater part of the whole country, but is not very common.

A species not possessing tails, but furnished with several tooth-like projections on the lower wings, is *Thecla irus*. The body and wings on the upper side are dark brown without markings, save that on the lower wings the prolongations are tipped with black, and a

narrow black line runs from the inner angle along the outer margin to the upper angle. On the under side the inner two-thirds of the upper wings is dark reddish brown, edged externally on the upper



Thecla irus.

portion with a white line. The outer third is light reddish brown darker toward the margin, and containing a few faint dark brown spots. A band along the lower margin of the wing is grayish brown. On the lower wings next the body is an area of dark gray, with an irregular dark reddish brown patch, which commences wide at the upper margin and ends in a point at the middle of the



Thecla irus. Under side.

inner margin. The remainder of the wing is occupied by a gray area, brownish toward the upper margin, where it encloses a few vague brown spots. The projections on the wings are dark brown, and a small black spot is located above the base of the lower pair. A few brown spots are placed in the middle of the gray area, extending in a row from the inner margin to just above the black spot. I have taken this butterfly but rarely in eastern Massachusetts, and have had specimens sent me from Ontario. It is found throughout the eastern, middle and western states.

Another tailless variety, but having points on the lower wing, is *Thecla niphon*. The upper side is reddish brown, blackish on the margin of the wings. In the female the middle of the fore wings

and the lower part of the lower wings is occupied by a large patch of rusty brown. This color is wanting in the male, except on the lower wings near the lower angle. The margin of the upper wing is composed of a yellowish fringe, black dotted, and the projections on the lower wings are black with a yellowish fringe between them. The



Thecla nippon.

under side of the wings is reddish brown with numerous reddish, black and white lines and spots covering their surfaces, arranged in a zigzag pattern, the detail of which may be better understood by reference to the illustration than by any written description. The effect is pleasing and is probably protective, rendering the butterfly



Thecla nippon. Under side.

less easily seen by its enemies. This butterfly makes its appearance early in the season, and in the latter part of April and early in May is to be met with on warm days along roads or paths, through forests or tracts of scrub oaks and pines. It is a lively little creature, like so many other members of this interesting genus, and may frequently be seen in numbers of three or four chasing each other about in the warm sunshine. When at rest, on account of its resemblance to a fragment of dried leaf, it is not easily seen, and one must work quickly to take it with the net as it flits past. The larva feeds on the pine and is green in color with a white stripe on each side, and

one of yellow down the middle of the back. The insect inhabits the eastern, middle and western states.



Thecla augustus.

Thecla augustus is a common little butterfly throughout New England early in the spring, and is often seen on the wing soon after the snow has left. The lower wings are slightly scalloped, and a prominent rounded projection is located at the inner angle. The upper surface is wholly dark brown without markings of any kind. On the under side the upper wings are yellowish brown on their



Thecla augustus. Under side.

outer third, while a broad area of reddish brown, outlined with a faint black mark, occupies most of the remainder of the surface, the lower margin being grayish. The outer half of the lower wings is reddish brown, with a row of small black dots running through the middle from the upper to the lower margin. The basal half of the wing is dark reddish brown, with an irregular outline, edged with a faint black line. The body and legs are gray.

It is frequently found in company with *Thecla niphon*. It is not a rapid flyer in comparison with other species of this genus, but it is so small and plain in color that it is liable to escape observation.

This genus of *Thecla* is so well represented in our country, some species are so exquisitely colored, the shapes and habits of many



UPPER SIDE



UNDER SIDE

LIBYTREA BACHMANI

of the larvæ are so different from those of other butterflies, that it is a group of unusual interest to the collector. Then, too, the life-histories of several of the species are still unknown, or only known in a very imperfect manner. On account of their small size, the extreme wariness, and also the rarity of some of the species, careful observation and patience are requisite to their capture and study, but the hours never seem long or the time ill-spent to him who is keenly interested in the pursuit and study of these minute but fascinating creatures.

The genus *Libythea* is distinguished by having short angular wings and very long pointed palpi, extending out beyond the head in such a manner that the butterflies belonging to this genus have earned the common names of "Long beaks" and "Snout butterflies." The males have but four well-developed legs (thus showing their close relationship to the *Satyridæ* and the *Nymphalidæ*), while the females have six.

The insects are of different shades of brown, with yellowish and whitish markings. We have but three species in the United States, while but one of these, *Libythea bachmanni*, inhabits the eastern half of the country.

This butterfly varies a good deal in coloring, some specimens being much lighter and more reddish than others. The markings, also, of the under side are distinct and clear cut in some, and very vague in other specimens.

I have never observed this butterfly in New England, but in the west and south it is not rare, and Packard states that it is found in Central America and the West Indies. I have taken it early in August in some numbers, at Batesville, Arkansas. Here, along the pebbly shore of the White River, a good many specimens could be seen, standing with their wings erect, and sipping the moisture from wet spots in the bed. They were excessively shy and difficult to capture, and when alarmed flew very rapidly, but soon alighted. They did not mingle with the other butterflies, which in places were crowded together in dozens, but always alighted on the water-worn stones well out toward the river.

The larva is dark green, without spines, but having many light yellow points, giving it a rough appearance. According to French, it feeds on the nettle tree (*Celtis occidentalis*), only one egg being placed by the female to a branch. The chrysalis is bluish green and slightly angular.

*SATYRIDÆ.**Wood Nymphs. Browns.*

The family *Satyridæ* contains a number of medium sized, plain colored butterflies, mostly of different shades of brown, whose only ornamentation usually consists of numerous eye-like spots, most dis-

Larva of *Satyrus*.

tinctly traced on the under side. The larvæ are cylindrical, tapering toward both ends, particularly the hinder extremity, which is terminated by two points. They are usually covered with soft, short hairs, springing from minute warts. Many species feed on grasses. The chrysalides are not angular, differing in this respect in a striking manner from those of the succeeding family. They are usually sus-

Chrysalis of *Satyrus*.

pended by the tail from a silken mat, although sometimes they are found loose among leaves on the ground. Like the *Nymphalidæ* they lack the silken thread passing around the body, which is the principal characteristic of the *Papilionidæ*. The perfect insects possess but four well-developed legs, the forward pair being almost aborted. Their wings are broad and rounded at the ends, and their bodies are small and weak. They are sometimes seen in great numbers, and are most often found in or near wooded tracts. Their flight is slow, and most of the species are easily taken with the net.

Our first example of this group, *Chionobas semidea*, is an insect of great interest to the entomologist, on account of its probably being a survivor of an arctic pre-glacial species, driven to more southern latitudes by the cold of the ice age, and later having advanced up the mountain sides as the ice sheet gradually melted, being thus cut off from a retreat to its former northern habitat by intervening regions

too warm for its existence. It is now found rarely on the tops of some of the highest mountains in New Hampshire, and in similar



Chionobas semidea.

situations on the Rocky Mountains in Colorado. In coloring the insect is plain, being an even tint of brown above without spots or markings, save on the upper margin of the fore wings, which is marked with white and dark brown, and the fringe on the outer margin which is light yellowish marked with dark brown spots. This is most distinctly shown on the under side. Beneath, the fore



Chionobas semidea. Under side.

wings are plain brown, except along the upper margin and the apex, which is marked with short, irregular lines of dark brown, yellowish brown and white. The lower wings are marked with light brown,

dark brown and white, the shades being distributed in an irregular manner. The base of the wing is dark brown, then comes an uneven band of lighter brown, outside of which is a wide band of dark brown made up of numerous irregular markings. Beyond this the wing is lighter, with many white streaks, the brown markings again growing more numerous toward the outer margin. The scales are not thickly laid on the wings, and on holding a specimen toward the light it will be seen to be semi-transparent, particularly the lower portion of the upper wings. The thorax is hairy below. The antennæ are spotted with white and brown, and the slender club is reddish.

From the middle to the latter part of July this butterfly may be seen in numbers near the top of Mount Washington, New Hampshire, and one or two other points of almost equal elevation. It is worth a climb of several thousand feet to see this interesting species in its bleak and wind-swept home. The weather is frequently very cold and windy here, and it often hails and even snows in the summer time, but let the sun come out for half an hour, and out will come the butterflies as if they were flitting about a lowland meadow and a snow squall was the last thing to be thought of. They hug the ground pretty closely while on the wing, but they are not rapid or strong flyers, and it is a wonder that ere this they have not been swept out of existence. The larva is said to feed on lichens.



Satyrus alope. Male.

Satyrus alope makes its appearance early in July, and is usually very abundant by the middle of that month in low lands, along brooks or ponds fringed with a line of bushes or trees. It is not a



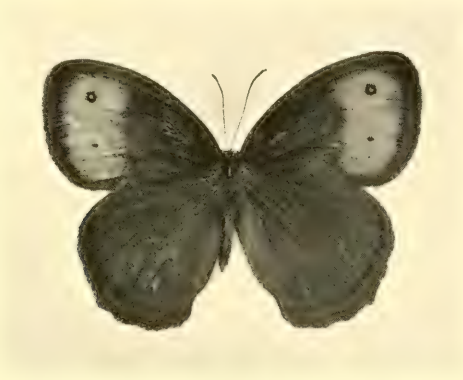
UPPER SIDE



UNDER SIDE

SATYRUS ALOPE

rapid flyer, generally keeping near the ground and often alighting in the coarse grass or on the foliage of the bushes. The females are



Satyrus alope. Male.

considerably larger than the males, and there is a good deal of variation between individuals in regard to the size of the eye-spots, as the accompanying illustrations from those captured in the same locality



Satyrus alope. Female.

will show. An interesting capture made in Wellesley, Mass., is shown in the following illustration. It is doubtless an albino, and is an example of the strangely colored insects one may occasionally take while collecting large numbers of specimens. The ground tint is a light tan color streaked with light brown, and the patch on the

fore wing is bright yellowish orange, the eye-spots being small and rather dim.

Specimens may be occasionally taken, particularly where the present species and *Satyrus nephele* are found in the same locality, where there is great variation in the size of the yellowish tan patch



Satyrus alope. Albedo.

on the fore wings. In fact, there is a gradual gradation between those in which the spot is large and well defined to others where there is a mere shade of tan color around the two large eye-spots. By some authors the following species, where this color is entirely wanting, is considered but a well-marked variety of *Satyrus alope*. As distinctions between varieties and species are more or less arbitrary, and considering the fact that if we could see all the intervening varieties, one species would blend insensibly into another, one must conclude that a knowledge of the habits of an animal is more useful than an ability to separate by these nice distinctions varieties from species.

As the flight of these insects is weak, they have been obliged to resort to a number of tricks to outwit their enemies. In capturing these butterflies the collector will very soon become acquainted with their modes of escape, which are very interesting, and show no small amount of cunning, scarcely to be looked for in an innocent little butterfly. Their first plan of escape on being disturbed is to make directly for a clump of bushes, into the thickest part of which they dive, and there remain until the danger is past. If one is startled from the grass at some distance from a safe retreat, and the collector overtakes him, he will immediately dodge backward and forward, at

one time high in air and again low down near the grass tops, and in spite of his slow flight, keeping well clear of the net. If the net is at last brought very close to him, he will try his last desperate scheme to elude his pursuer, and shutting his wings quickly together will drop into the grass, disappearing as if by magic. If it were not for the cunning of these frail little creatures, they would doubtless have gone to the wall long ago in the struggle for existence.

The larva is cylindrical, tapering toward both ends, and has a forked tail. It is yellowish green in color, and covered with fine white hairs. When partly grown it passes the winter hidden among the lower stems of the coarse swamp grass, upon which it feeds, and the next summer completes its growth, changes to a green chrysalis, and emerges a perfect fly.

This butterfly with its varieties is a plentiful insect over the eastern half of the country except in the extreme south.



Satyrus nephele.

A more northern species than the preceding, and abundant in the northern part of the United States and Canada, is *Satyrus nephele*. In this insect the upper side is dark brown, without the ochre patch on the forward wings. Two small black eye-spots on the upper wing, surrounded with a faint yellowish brown ring, correspond with the large eye-spots of the preceding species. On the lower wing there is usually a single small black spot. These constitute the only markings of the upper side. On the under side the general color is much the same. The spots on the fore wings are enlarged, pupilled with white, and encircled with distinct rings of tan color. Several smaller rings adorn the lower wings. The inner half of both sets of

wings is marked with short lines of blackish brown, which run together near the body. This area of dark lines is outlined with a heavy irregular dark line. Outside of this on the lower wings the fine dark lines still continue, but they are fainter and shorter. The habits of this insect are identical with the preceding species.



Satyrus nephele. Under side.

Satyrus pegala is a southern species, being found along the gulf states, and as far north as New Jersey on the east coast. It much resembles *Satyrus alope*, but the lower eye-spot on the upper wing is very small and without the central white or bluish pupil. Its habits closely resemble those of the two preceding species, and its larva lives on coarse grasses.

Neonympha eurythris (spelled also *eurythris*) is, where it occurs, one of the most plentiful of butterflies, being seen sometimes in great numbers in upland wooded districts. It is a short-lived little creature, however, and is so fragile and delicate that a cold storm or a heavy wind will destroy it by thousands. This destruction may be easily noticed if a long cold storm occurs during the greatest abundance of the species, as the butterflies, for a day or two afterward, will be scarce and badly worn, and as they again increase in abundance from day to day they will be found to be nearly all in perfect condition, as their numbers are augmented by the hatching out of fresh specimens. This is a pretty good argument for the collector to use when accused of the wanton destruction of innocent life by the oversensitive persons that are occasionally met with while one is out with the net. How many butterflies will all the collectors in the world capture in one year in comparison with those exterminated by natural causes, sometimes in a single night? Very few, surely.



UPPER SIDE



UNDER SIDE

NEONYMPHA. EURYTHRIS

With any of the commoner species the collector is not a factor in diminishing their numbers. These kindly disposed persons, before they pass judgment on the collectors for cruelty, should think of the parasites which so often inhabit the larvæ of butterflies and moths, gradually eating away their substance till they are little more than animated skins filled with a wriggling mass of maggots, lingering in this condition for days, so weak as to be scarcely able to crawl. The industrious and painstaking collector, who is endeavoring to increase his knowledge or adorn his cabinet with fresh and perfect specimens, should have every encouragement; he is a public benefactor.

This butterfly is most abundant the latter part of June, and the woods are then fairly alive with them. At this time many specimens stray into the open fields and may be seen about our dwellings, although they act as though they felt out of place, and would gladly be back in the woods, where they prefer tracts containing a thick undergrowth of bushes. They fly low, just above the ground, with a rather slow but unsteady or jerky motion, and often alight on the low herbage. To get perfect specimens one must take them very soon after they make their appearance, as they are so apt to become worn or ragged. This species is probably double-brooded to a limited extent, as one may occasionally take perfect specimens in August or early in September; but these are scarce in comparison with the June brood. The majority evidently prefer to go over to the next season. The larva is brownish, darker on the sides, and the body is covered with short brown hairs. The winter is passed in the larval state. The insect inhabits the eastern half of the country.



Neonympha canthus. Male.

A somewhat northern species is *Neonympha canthus*, and it is plentiful in parts of New England and Canada. It usually inhabits woods,

but is rarely, if ever, to be found in such abundance as the preceding species, and its time of appearance is later, usually about the middle of July. The insect, though timid, is not a rapid flyer, and seems to be somewhat gregarious in its habits, for, where one is seen, a number may often be started from the trees and bushes in its immediate vicinity.

The saying that "one sees what he is looking for" was never better exemplified than with reference to the collecting of many of



Neonympha canthus. Male.

our butterflies and moths, and the shy and retiring species under consideration is a good example. Were one not diligently looking for the insect, and acquainted with the kind of locality in which it is



Neonympha canthus. Male. Under side.

usually found, he would probably never dream of its existence unless by accident he ran across a colony. These butterflies seldom stray far from where they emerge from the chrysalis, and on account of

their delicate structure, their lives are probably very short. There is considerable variation both between the sexes and between individuals of the same sex. The males are generally smaller than the



Neonympha canthus. Female.

females, and are darker in color. In the female there is usually a light yellowish gray band on the upper side, which crosses the forward wing about one-third from the end, and the spots on both



Neonympha canthus. Female. Under side.

wings are encircled with yellowish gray. These differences can be readily seen in the accompanying illustrations. The sizes of the eye-spots in individuals of the same sex often vary in a marked degree, even in specimens from the same locality. In some they show scarcely more than dots on the upper side, and in others they are large and prominent on both sides.

The caterpillar feeds on grass. It is greenish and downy, and

hibernates over winter in a half-grown state, completing its growth the next season. The chrysalis is green.



Neonympha gemma. Upper and under side.

An extremely delicate little butterfly is *Neonympha gemma*. The wings are light grayish brown, slightly darker toward their outer margins, and are without markings, except two small spots of brown near the outer margin of each lower wing. On the under side the wings are crossed by two faint wavy lines of brown, and next their base are marked with a few short irregular brown lines. Next the outer margin of the lower wings, and bordered inwardly with a grayish pink area, is a row of four sharply-defined small black spots, each having a silvery centre. Several splashes of silver extend along the margin both above and below the row of spots.

This insect is southern in its range, from Virginia southward.



Neonympha sosybius. Upper and under side.

About the same size as the preceding species and of a brownish gray, with slightly pinkish reflections, is *Neonympha sosybius*. The upper side is without spots or markings, except three faint lines along the outer margins. The under side is a much lighter gray,

with two strong brown lines crossing both sets of wings. On the upper wings, beginning near the upper angle, is a row of four brown and one black eye-spots, each surrounded with a yellow ring and having a central silver dot, and this row is continued on the lower wings, where there are three brown and three black spots. Three brown lines follow the margins of the wings.

This is also a southern species, being found from Virginia southward and westward.



Debis portlandia.

Debis portlandia. The general color of this insect is light wood brown, the outer third of the forward wings being pale, with an



Debis portlandia. Under side.

irregular dark line separating it from the general color of the wing. This line is darkest and widest near the upper margin, and is bordered outwardly by a light yellowish gray area. There are three

large dark brown spots with black centres (the lower one being the largest), and one very small spot on the outward third of the upper wing. These spots are surrounded with a ring of pale yellow. On the lower wings are five large dark brown spots, similar to those above. These are arranged as shown in the accompanying figure. The margins of all four wings are darker, and are fringed with white interrupted with tufts of brown scales at the ends of the veins. Two pale grayish lines follow the outer margins of the wings. The thorax is gray, the head and abdomen yellowish brown. The under side is very prettily marked; the general color is about the same as the upper side except that there is a slightly pinkish tinge; but running across both sets of wings, from near the middle of the upper margin of the upper wings, is a wide irregular bar of gray brown, with several indentations and projections on the outer edge. This bar is outlined on both edges with a line of brown. Outside of this is a light yellowish gray area. On the outer third of the upper wing is a row of fine blackish brown spots of various sizes. These are each pupilled with white and encircled with a yellow ring. Outside of this, and enclosing the row of spots, is a line of whitish. The lower wing is also supplied with a number of spots similar to those on the upper wing. The whitish line is also continued, the large spot near the upper margin, and the double spot at the lower end of the row, being encircled by it, while it follows as a wavy line on both sides of the other spots. The entire margin is darker, and a light gray line follows it on both wings. The body and legs are light yellowish; the abdomen near the thorax is white.

This insect inhabits the whole eastern half of the continent, but is very rare in New England so far as my experience goes, although it is a common butterfly in several of the western states. It inhabits wooded districts, particularly the growths of willows along rivers. It is apparently somewhat gregarious, as in walking along the banks of a stream where coarse grasses grow among the trees, one will frequently start it up in numbers, but only in a space covering a few square rods. I have seen it very abundant in Iowa, about the middle of July, along the Iowa and Skunk rivers. The insects usually alight on the tree trunks and among the coarse grasses, and fly but a short distance in a slow and uncertain manner, so that one may catch them in the hands even while on the wing. When not disturbed, they move and turn about at short intervals as if in play, or to take in the view from every direction. The insects vary a good deal in

their markings, some having much larger and darker eye-spots than others.

The larva feeds upon grasses, and is cylindrical in shape, tapering towards both ends, the posterior being forked into two short tails. It is greenish yellow in color, striped with yellow and dark green. The chrysalis is green and smooth, and is often attached to the stems or blades of the grass on which the larva has fed.

NYMPHALIDÆ.

Angle Wings. Silver spots.

The great family of *Nymphalidæ* contains a larger number of species and genera than any other group of butterflies. It comprises many good sized and beautiful insects, and most of our well-known and showy specimens belong to this group. The family has a world-wide range, members belonging to it being found in every country on the earth. Many of the individual species have a wide geographical distribution, several being well known in half the inhabited regions of the globe. Many of the larvæ of these butterflies are covered with spines or stout bristles, while others are adorned with fleshy filaments. The chrysalis is stout, and is suspended from a patch of silk by the posterior end of the body, without the thread of silk which passes around the body of the chrysalis of the *Papilionidæ*. A large number of the chrysalides are angular, some being adorned with stout, sharp pointed spines or projections, while others are comparatively smooth. Some are beautifully marked with golden or silvery spots, and are a delight to look upon. The chrysalis stage usually lasts about two weeks, depending largely on the temperature.

The butterflies of this group are many of them active, rapid flying insects, with stout bodies, and frequently colored in a brilliant and striking manner. They have but four well developed legs, the forward pair being aborted and of very little use to the insect. A deep groove on the lower wings partly encloses the abdomen on either side.

In his excellent work on "Insects Injurious to Vegetation," Mr. Harris describes the way in which a caterpillar of this family sheds its skin and becomes a chrysalis, in such a complete and beautifully written manner, that I have concluded to insert it here instead of describing the process in my own words. He says of the *Nymphalidæ*: "Their caterpillars, when about to transform, do not make a

loop to support the fore part of the body, but suspend themselves vertically by the hindmost feet. As they all secure themselves pretty much in the same way, it may be proper to explain the process. Having finished eating, the caterpillar wanders about till it has discovered a suitable situation in which to pass through its transformations. This may be under the side of a branch or of a leaf or any other horizontal object beneath which it can find sufficient room for its future operations. Here it spins a web or tuft of silk, fastening it securely to the surface beneath which it is resting, entangles the hooks of its hindmost feet among the threads, and then contracts its body and lets itself drop so as to hang suspended by the hind feet alone, the head and fore part of the body being curved upwards in the form of a hook. After some hours, the skin over the bent part of the body is rent, the fore part of the chrysalis protrudes from the fissure, and, by a wriggling kind of motion, the caterpillar skin is stripped backwards till only the extremity of the chrysalis remains attached to it. The chrysalis has now to release itself entirely from the caterpillar skin, which is gathered in folds around its tail, and to make itself fast to the silken tuft by the minute hooks with which the hinder extremity is provided. Not having the assistance of a transverse loop to support its body while it disengages its tail, the attempt would seem perilous in the extreme, if not impossible. Without having witnessed the operation, we should suppose that the insect would inevitably fall while endeavoring to accomplish its object. But, although unprovided with ordinary limbs, it is not left without the means to extricate itself from its present difficulty. The hinder and tapering part of the chrysalis consists of several rings or segments, so joined together as to be capable of moving from side to side upon each other; and these supply to it the place of hands. By bending together two of these rings near the middle of the body, the chrysalis seizes, in the crevice between them, a portion of the empty caterpillar skin, and clings to it so as to support itself while it withdraws its tail from the remainder of the skin. It is now wholly out of the skin, to which it hangs suspended by nipping together the rings of its body; but, as the chrysalis is much shorter than the caterpillar, it is yet some distance from the tuft of silk to which it must climb before it can fix in it the hooks of its hinder extremity. To do this, it extends the rings of its body as far apart as possible, then, bending together two of them above those by which it is suspended, it catches hold of the skin higher up, at the

same time letting go below, and by repeating this process with different rings in succession, it at length reaches the tuft of silk, entangles its hooks among the threads, and then hangs suspended without further risk of falling. It next contrives to dislodge the cast caterpillar skin by whirling itself around repeatedly, till the old skin is finally loosened from its attachment and falls to the ground. The whole of this operation, difficult as it may seem, is performed in the space of a very few minutes, and rarely does this insect fail to accomplish it successfully and safely."

So rapidly is a part of this process performed, particularly the withdrawing of the tail of the chrysalis from the caterpillar skin and the climbing up and fastening of its hooks in the mat of silk, that one can scarcely understand how it is done until he has seen it over and over again.

The genus *Paphia* is confined to the American continent, and most of the species are from Central and South America. The upper wings are pointed, and the lower pair is usually adorned with a narrow tail on each wing. Many of the species are richly colored with purplish brown, pinkish brown, bluish black, greenish black, etc.; but not many are brilliant in comparison with those of other tropical butterflies.



Paphia troglodyta. Male.

A fine insect, found throughout the western and southwestern states, is *Paphia troglodyta*. In color the male is copper red, the outer margin of the wings being brownish on the upper pair and blackish on the lower. The female is not so bright a red, and numer-

ous black markings are distributed over the wings as shown in the figure. On the outer third of both sets of wings is a wide, light area of yellow, which in the upper wings takes the form of a broad band, branching at the top. In the lower wings this yellow band blends into the other colors of the wing about half-way across from the upper margin. The under side of both sexes is much the same and is often a grayish brown, which harmonizes with the bark of trees upon which the insects often alight. This color of the under side is very variable, and specimens may be found varying from light grayish brown to a deep red brown. The caterpillar is a curious looking creature, tapering both ways from the middle, particularly toward the posterior end. The head is of good size, and,



Paphia troglodyta. Female.

when the animal is extended, it is seen to have quite a neck; reminding one in this respect of the larva of the *Hesperidæ*. In color it is bluish green, and the surface of its body is rough, being covered with fine whitish points. Its food plant is the goat-weed. The chrysalis is short and thick, and varies in color from light greenish to greenish brown.

This butterfly I have seen in many places in the west during July and August. It is a strong and rapid flyer, and were it as wary as it is active, it would be a difficult insect to capture. It frequently alights on the topmost twig of a bush, or on a fence post, where it can have an unobstructed view of all about, and from this retreat it sallies forth to meet and give battle to each intruder on its chosen



UPPER SIDE



UNDER SIDE

PAPHIA TROGLODYTA

domain. While the insect is at rest one may cautiously advance quite near, but any sudden movement will alarm it, when off it will go so rapidly that one can scarcely see it. It frequently returns to the same spot in a few moments, and resting with half-spread wings, looks as if daring the observer to make another trial to take it captive. It is sometimes too confident of its powers, and finds itself a prisoner, when its struggles to escape are indeed desperate. So bold is this butterfly at times, that after striking at it with the net and missing it, I have had it alight on my hat or my clothing, as if it considered the performance good sport and desired me to try again.

My brother had an interesting experience with this butterfly during the latter part of July in southeastern Missouri. He discovered, resting on the leaves of trees surrounding a patch of goat-weed, a number of the males of this species, waiting for the females to make their appearance. The males were very shy and active, so much so, in fact, that he almost came to the conclusion that he would not be able to capture any, until he hit upon this plan: after seeing one alight on a leaf, he would carefully walk around to the back of the tree, and then come up under him, when he would see his shadow from the under side of the leaf, and with a quick movement of the net make him captive. The females were not so alert or active, and flew low down near the ground, often alighting on the goat-weed to deposit their eggs.



Larva of *Apatura*.

Species of the genus *Apatura* inhabit North and South America, Europe and Asia, and among them are some of the most brilliantly colored butterflies known. Their sombre ground colors of dark brown and black throw into strong relief the flashing green, blue, purple and lilac with which Nature has so lavishly adorned them. Sometimes these colors are in the shape of wide bars or patches, and again even covering the whole surface of the wings, as

seen in certain lights. The insects are supplied with long, clubbed antennæ, a stout thorax furnishing room for the powerful muscles to move their strong wings, and a short, small abdomen. They are exceedingly active, and fly with great rapidity, although their flight is not usually long sustained. The under side of the wings is usually adorned with eye-like spots. In some species these are numerous, in others there is but one to each side. Several of the most beautiful species inhabit Mexico and Central America.



Apatura clyton. Male.

Our best known of the four species of this genus inhabiting the eastern half of the United States is *Apatura clyton*. There is a good deal of difference in size between the sexes, as will be seen by reference to the illustrations. The upper wings of the male are light rusty brown on the inner half, the outer half being dark brown. Two irregular rows of large rusty yellow spots are located on the outer half, the inner row margined on the inner side by a black line. A row of tawny spots runs along the outer margin, beginning large at the lower angle and growing smaller and finally fading out toward the apex of the wing. Two uneven black marks are placed just below the upper margin on the inner third. The lower wings almost reverse the coloring of the upper pair, and with the exception of the concave inner margin, which is yellowish gray, the inner half of the wing is reddish brown and the outer half reddish yellow or tawny orange. The veins are dark brown, the outer margin brown. Six roundish black spots extend in an irregular line from near the upper margin across the wing to near the lower angle. The thorax and abdomen are greenish brown. The spots and markings of the



UPPER SIDE



UNDER SIDE

APATURA CLYTON

upper side of the upper wings are reproduced below, but are fainter, and over the whole surface is a pinkish tinge. This extends over the lower wings also, which are more sombre, and lack the tawny



Apatura clyton. Female.

orange area of the upper side. The inner half next the body is grayish brown, then comes an irregular band of pale yellow, growing darker and blending into the other color toward the lower angle ;



Apatura clyton. Male. Under side.

then a wide area of pinkish brown, containing seven black spots, encircled with narrow rings of rusty brown, and pupilled with blue, the lowest spot being double ; lastly, there are two wavy brown lines following the outer margin, with a faint yellowish line between them. The thorax and abdomen yellowish gray, the legs light. The

female is not marked so strikingly, and is more yellowish above. The tawny orange patch is lacking on the lower wings, but the large black spots are encircled with rings of reddish yellow. The under side is pale, and most of the markings are softly blended. The round spots are indicated below with obscure spots of brown, only one or two of which have blue centres. A fine line of white runs along the outer margins of both wings. The thorax and abdomen are yellowish gray.



Apatura clyton. Dimorphic form.

A dimorphic form is occasionally taken, in which the lower wing, except the inner third, is dark brown, with a row of large black spots encircled with red brown, outside of which are several vague



Chrysalis of *Apatura clyton*.

crescents of a tawny color. This form has been given the name of variety *ocellata*.

The female of this species lays its eggs, which are yellowish white, on the hackberry in a compact patch, usually on the under side of a leaf. The larva is light green in color, striped with yel-

low. It is rough and firm to the touch, the posterior extremity is prolonged into two short tails, and the head is adorned with curious spiny projections or branching horns, which have suggested the name of antlers to some authors. There is but one brood in a season, and the half-grown larvæ for the next summer's butterflies winter in a torpid state. The chrysalis is yellowish green and somewhat angular.

This butterfly, like all the other members of the genus *Apatura* with which I am acquainted, is a strong and rapid flyer. It frequents the outskirts of woods and groves, and often alights on the trunks of trees. It is very pugnacious, giving battle to all intruders on its chosen domain. The butterfly makes its appearance in July, and it inhabits the southern and southwestern states.



Apaturaceltis. Male.

A smaller species than those preceding is *Apatura celtis*. The upper wings are greenish gray or olive gray on their lower half, the upper half being dark brown. Two irregular rows of pale yellowish spots, the outer one extending but half across the wing from the upper margin, are located on the outer half. Two short black marks are placed just below the upper margin. These are bordered externally with pale yellow spots. One black eye-spot, enclosed in a tawny ring, is situated at the lower end of the outward line of yellowish spots. A line of faint tawny spots follows the outer margin. The veins are black. The lower wings have a slightly reddish tinge in comparison with the upper pair, and are darker near their base. A light area on the outer half of the wing contains several small black spots, and outside of these are two dark brown wavy

lines. On the outer margin of all four wings is a narrow white line, interrupted with black at the ends of the veins. The thorax is bluish black, the abdomen brown. The under surface is lighter, the inner half of all four wings being gray with a slightly bluish cast. The outer half is grayish brown. The markings of the upper side are repeated below in a general way. There is an extra eye-spot



Apatura celtis. Male. Under side.

with a whitish dot near the apex of the fore wing, and the black spots on the lower wings are pupilled with blue. The thorax and legs are yellowish gray, and the abdomen rusty. The larva feeds on the leaves of the hackberry. It is light green, with a row of yellow spots on its back and yellow lines along its sides. Its head is adorned with horns as in other species.

My brothers had some experience in capturing this butterfly near Chillicothe, Ohio, in the month of July. It was most plentiful near trees, often alighting on their trunks. When disturbed it flew very rapidly in an eccentric manner for a short distance and then alighted suddenly. Several times the insects lit on their clothing and nets, and once or twice actually on their faces. The habitat of this species is the southern and western states. It does not live farther north than the middle of Ohio, and I have never known of a specimen being taken in New England.

In *Apatura flora* the ground color is reddish tan, with the markings and spots strong and sharply defined. The wings are margined with a heavy dark brown band, and the eye-spots on the lower pair are large and conspicuous.

The female is a good deal larger than her mate, but is much paler in coloring, the wings being also without the heavy dark brown

margins peculiar to the male. The eye-spots are large and conspicuous.



Apatura flora.

This is a common insect in Florida and along the gulf states to Texas, where it has much the same habits as the other species of the genus.



Apatura alicia

Another insect belonging to this genus whose habitat is Florida and the gulf states is *Apatura alicia*. The ground color of the upper side is reddish fawn, paler toward the outer margins. The markings and spots are very distinct, and the outer half of the upper wings is black with white and light yellow spots. The wings are margined with a broad line of brown. The female is somewhat paler, and is also larger than the male.

This species may be easily distinguished from *Apatura flora* and *Apatura clyton* by the eye-spot on the upper side of the upper wing near the outer margin. *Apatura celtis* has this spot, but the insect is smaller and more sombre in color than the present species.

The genus *Limenitis* is distinguished by having straight and slender antennæ, with a gradual thickening toward the end instead of a distinct club. The lower wings are scalloped. This genus comprises several very fine butterflies inhabiting the eastern half of the country, while two or three more occur in the west. The larvæ are interesting from their peculiar manner of hibernating, and also on account of the humps and horns with which their bodies are adorned. They are of various colors, being generally mottled and spotted in a striking manner.



Limenitis ursula. Male.

A very beautiful species of this genus, and one with which almost every young collector is familiar, is *Limenitis ursula*. The butterfly is plentiful in June, and may most often be seen about damp places on the roads, where it is usually so intent on sipping the dirty water that it may be easily taken. After it is once alarmed it is a very difficult insect to capture, as it flies rapidly and is very wary. Sometimes a second brood makes its appearance early in September. In Massachusetts it is not often common at that time of year, but in Ohio and others of the western states the second brood is sometimes as numerous as the first, and under the sweet apple and pear trees I

have often seen many of these fine butterflies resting on the half-decayed fruit, slowly opening and shutting together their blue, purple and black wings, the picture of satisfied contentment. They are very tame under these circumstances, and one may with caution move quite close to them and enjoy their rare beauty.

How many happy hours slip away while one is thus engaged in watching and admiring! What a school this study of entomology is for the children! It takes them into the sunny fields, gives them plenty of exercise, and fills their minds with pleasant and interesting thoughts. A boy with a net in his hand, a cyanide bottle, and plenty



Limenitis ursula. Female.

of insect papers in his pockets, and with a little encouragement in the right direction from his parents, is not the boy who is likely to get into mischief. His mind and time are too well occupied for that.

But I am wandering from my subject. There is usually some difference in size between the sexes of this species of *Limenitis*, the male being the smaller and also the brighter in coloring. The spots of color are usually more sharply defined in the male, and the deep orange spots on the under side are larger and more intense. Occasionally specimens are captured, and these are always males according to my experience, which are a deep rich purple over nearly all of the upper surface. These captures are rare, but the insects are so

beautiful that, when successful, one will consider the time well spent in striving at them.

This species is found over the whole of the eastern United States,



Limenitis. Hybrid. Male.

except the most northern part, where another allied insect, *Limenitis arthemis*, takes its place. Hybrids between these two species, or what are supposed to be such by naturalists, are occasionally taken. These vary from insects which show a slight trace of the white bars across the



Limenitis. Hybrid. Male. Under side.

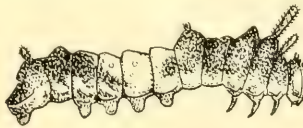
wings, to those in which the bars are almost as conspicuous as in the following described species. The coloring of the rest of the insect is similar to *Limenitis ursula*. The larva is a curiously shaped and

strikingly marked creature. Its body is humped, and rough horns are placed on the forward part of the body. Its colors are brown, white and green, dark at either end, but spotted and variegated in such a way that the insect is difficult to see while feeding, or at rest



Limenitis. Hybrid. Female.

on its food plant, the oak, wild cherry or willow, and looks not unlike that of *Limenitis disippus*; so much so that a person can never be sure when he finds one (particularly as both species live on much the



Larva of *Limenitis ursula*.

same plants), which butterfly it will eventually make. There is frequently a good deal of variation in these larvæ, even when full grown, some specimens being chocolate brown, and almost black toward the head and tail, while others are light green, with a white band over the back, and a brown head and tail. Each of the last brood of the season, while the caterpillars are very minute, makes a silk lined tube enclosed in a small leaf at the end of a twig. This

ingeniously made little habitation, to which the caterpillar always leaves the shrivelled end of the leaf attached to serve as a porch or veranda on which to crawl out. serves as its winter home. This leaf



Chrysalis of *Limenitis ursula*.



Chrysalis of *Limenitis arthemis*.

is attached by silk to the twig, and here it weathers the blasts of winter, securely fastened. After the other leaves have fallen in the autumn, these "hibernacula," as they are called, may be easily found and kept in a cool place till the next season, when the broods may be started as soon as the buds begin to open. The chrysalis is as peculiar in shape as the larva, being angular, with a flat projection at the back. It is brown, gray, white and pinkish, the brown predominating.



Limenitis arthemis. Male.

Limenitis arthemis, although a somewhat smaller butterfly than the preceding is, nevertheless, a very fine insect. The habitat of this species is much more northern than the last described insect, being found throughout the northern part of the United States east

of the Rocky Mountains, and extending well up into Canada. The butterfly makes its appearance early in July, and in some of the hilly and mountainous districts of New Hampshire is a common butterfly at this time. Near Jackson, and along the Glen road between that place and the base of Mount Washington, is a good locality for this insect during the right season. It is quite abundant at and about Sunapee Lake, and I have taken a good many fine specimens of this and the preceding butterfly near the Sunapee steamboat landing. It frequently alights in the road and on the wayside bushes, and is not very shy, although a good flyer when alarmed. This butterfly is on rare occasions seen as far south as Boston, Mass., and a good many specimens have been taken at Mount Wachusett, near Princeton, in that State. There is little difference in the sexes except as to size,



Limenitis arthemis. Female.

the female being the larger. The caterpillar much resembles that of *Limenitis ursula* and *Limenitis dissipus*, both as to shape and coloring, except that as a general thing there is more brown and reddish brown. The larva hibernates in the same way as the preceding species, and in the next season completes its growth, making a chrysalis which, except in its smaller size, closely resembles the other native species of this genus.

An insect, which in its coloring differs greatly from most of the

other species of the genus, and closely resembles the butterfly *Danaïs archippus*, which is common throughout the United States, is *Limenitis disippus*. This resemblance is thought by naturalists to be more



Limenitis disippus. Male.

than accidental; that in fact it is a case of unconscious mimicry, in which a butterfly supposedly of good flavor and therefore eatable to birds has, with possibly a slight resemblance at first, by natural selection become more and more like a bitter tasting and therefore uneatable species, until it is an almost exact mimic of it. These examples of mimicry are not rare among many of the butterflies, particularly of tropical countries, and some exceedingly interesting examples have been discovered.

I well remember, when a little boy, thinking that these two butterflies were the same species, and I was sorely puzzled to know how two different kinds of "worms" making two totally different looking chrysalides could possibly hatch out into one and the same kind of butterfly. It was not until I had hatched a good many that the truth gradually dawned upon me. These butterflies may be reared in numbers by searching out the hibernacula during the fall and winter, and starting them on the first leaves of spring. They should be carefully guarded against parasites of various kinds, as the collector may repeat the experience of my brothers, who, having a number, put them to feed out of doors enclosed in netting. By some means the parasites made an entrance, and out of several hundred larvæ they managed to



UPPER SIDE



UNDER SIDE

LIMENITIS DISIPPUS

secure four perfect insects. The parasite is undoubtedly the most serious obstacle to the successful rearing of butterflies, and one must be constantly on the watch or his labors may count for naught.



Limenitis disippus. Female.

This *Limenitis* is the most common species of the genus in the east, and may be seen in June about willows or poplars, on which the larvæ feed. Although most of the last brood of larvæ hibernate over winter in their silk lined tubes, or cases, at the ends of the twigs, a good many complete their transformations in the late summer and fall of the year, and the perfect insects may be taken in September. The tiny green eggs, covered with a network pattern, are deposited singly by the female near the tips of the leaves. The young larvæ are almost black, but when nearly full grown assume almost the exact shape and color of *Limenitis ursula*. The chrysalis is also very similar to that species. The butterfly is not wary nor a rapid flyer, and may be easily taken. It usually frequents the edges of lines of bushes along rivers and brooks, and sometimes alights in the roads with other species of butterflies. This insect inhabits the whole of the United States.

Another butterfly, much resembling the preceding in shape and markings, but of a mahogany color in place of the reddish orange of the other species, is *Limenitis eros*. The black borders of the wings

are very heavy and the white spots show out in strong contrast. The general color is so dark that while on the wing the insect looks almost black. The larva of this butterfly feeds on the willow, and



Limenitis eros.

with its chrysalis is very like that of the last-described insect. It is probably only a well-marked variety of that form. The butterfly is found in many parts of the south, being common in Florida.

Victorina includes a few butterflies of good size and beautiful coloring. The ground color is dark brown or black relieved with wide bars and large oval spots of green. They are inhabitants of tropical America, and but one species strays into the southern parts of our country.

Victorina steneles is a large and strikingly handsome species, the large bands and spots of light pea green contrasting in a bold manner with the dark ground color. The under side is a most peculiar combination of colors; the ground is light yellowish brown and the green spots of the upper side show through below, though they are larger and more yellowish and a number of them are partially outlined with dark brown. As viewed in a side light the surface has a slightly satiny lustre.

This insect is very common in the low and hotter parts of Mexico near the coast, as well as in some of the islands of the West Indies,



Upper side.



Under side.

VICTORINA STENELES.

and I have had many sent me from Para, Brazil. It inhabits open country near forests, and is often seen with other butterflies at rest on the muddy banks of streams.

A very interesting as well as exceedingly beautiful group of butterflies is comprised in the genus *Ageronia*. These are inhabitants of Central and South America and the two species included in our fauna must be regarded as stragglers from lands farther south. The insects belonging to this group are of good size and are richly colored with spots and irregular lines, various shades of blue, brown and light gray predominating in some species. One of the most



Ageronia feronia.

beautiful is an intense blue black with spots of light blue above and red spots beneath. Another has a very pleasing pattern of blue spots and lines on a black ground above, while beneath a large part of the surface is bright red. These butterflies are frequently seen in the neighborhood of dwellings among scattered trees, and invariably alight on their trunks head downwards, with the wings spread wide open. They are exceedingly pugnacious, engaging in fierce battles with one another, and driving away other butterflies who may venture near their chosen retreat. Most curious to relate, they make while on the wing a snapping or clicking noise with their wings, which may be heard at a distance of two or three rods. They are

easily taken with the net when once one learns their habits, for on being disturbed they usually fly downward from the tree trunk on which they are at rest, and the collector placing his net beneath is almost sure to be rewarded with a capture.

Ageronia feronia is grayish brown with rings and irregular lines of blue and black. There are a number of large and small white or light gray spots on the upper wings and a few on the lower pair.



Ageronia feronia. Under side.

The under side is much lighter, being almost white, with black markings. In very fresh and perfect specimens there is a pinkish tint with a satiny gloss over the whole surface beneath.

In *Ageronia fornax* the upper side is colored much like the preceding insect, but the under side of the lower wings is light yellowish brown instead of white, and the large spots on the lower wings of *Ageronia feronia* have almost disappeared in this species. These two insects are occasionally taken in southern Texas. I know nothing of the early stages of these butterflies.

To the genera of *Hypolimnas* belongs a number of good-sized handsome butterflies, generally dark in color, with purple and blue reflections and large white spots. These butterflies are confined almost wholly to the tropics of Asia, Africa and Oceanica and are frequently very abundant where they are found.



Upper side.



Under side.

AGERONIA FORNAX.

Hypolimnas misippus is a common insect in tropical Asia, Africa and Australia, as well as South America, and is occasionally to be found within the borders of our own country in southern Florida. In the males the color is dark purple and blue black with a large oval white spot near the middle of each fore wing and a small one at the upper angle. A large circular white spot occupies the middle of each lower wing. In a ring around the white spots the metallic purple is most conspicuous and will be seen to the best advantage



Hypolimnas misippus. Male.

when the insect is held in a slanting position with its head toward the observer, particularly if the light be at his back.

In strong contrast to the male, the female is reddish orange, the upper wings being blackish brown on the upper and outer portion with several conspicuous white spots arranged in an irregular row crossing the outer third of the wing. Two rows of small light spots follow the outer margin. The lower wings are black bordered, containing faint orange spots along their outer margin.

The male insect is brown and black below with large white patches, which in the lower wings cover half their area. The female is much alike in coloring on both sides.

The female butterfly differs in such a striking manner from the male that one would never guess that they were related. It has a decided look like a *Danaïs* and is supposed to mimic species of that

genus. Indeed, so exactly does it imitate an Indian species of *Danaïs* inhabiting the same region with it that no one but a



Hypolimnas misippus. Male. Under side.

naturalist would ever imagine that they were distinct species belonging to different genera.



Hypolimnas misippus. Female.

This insect is rather shy and difficult of approach, and when once alarmed flies rapidly high up into the air. It is fond of the sweets from flowers, and when at rest on a fragrant blossom intent on extracting the honey it is most easily captured.

An allied but larger species, *Hypolimnas bolina*, I have seen very abundant in northern Australia, where the gorse hedges covered with yellow blossoms were a great attraction to it. One could approach closely and take these fine insects with little difficulty. Oh! but they were beauties, many of them fresh from their chrysalides; and when one opened the velvety black and rich, shining blue wings of a captive, the sight was dazzling and inspiring. One would think that having so good an opportunity I would have captured all I would ever be able to dispose of, but I am sorry to say that I have now but one specimen of the number I took.



Hypolimnas misippus. Female. Under side.

It can hardly be impressed too strongly on the mind of the collector that he should lay in large numbers of any good thing which he may find particularly abundant at any time.

The beginner frequently starts with the idea that he will make a collection containing one specimen of each species found in his immediate neighborhood. I remember hearing a little boy talking with his sister, to whom he had loaned his new butterfly net, and who had just come in with three splendid specimens of *Papilio turnus*, something after this fashion: "How many of these things do you think I want, any way? I just caught two myself. Now don't get any more, for goodness' sake." Well, after he has made a start he begins to notice that all specimens of the same species are

not alike; the males and females differ, and interesting varieties are occasionally taken. Then he wishes to show both the upper and the under side of the species, and at length he falls in with some other beginner who wants to exchange, and he then thinks of the many good specimens he might have collected. His ideas enlarge with his collections; his collector friends and his need for good specimens for exchange constantly increase, and the truth finally dawns on him that large numbers of first-class specimens are not only a convenience but almost a necessity if he desires to increase his own collection beyond the limits of those which he can himself capture.

Alfred Russell Wallace once told me that one of the hardest lessons he had to learn in his many years of collecting in tropical countries was that it is hardly possible to get too many specimens of a



Timetes petreus.

good species of bird, shell, beetle or butterfly, and that on several occasions he had retraced his journey hundreds of miles to little known islands to procure additional specimens of species he had previously collected, at the time supposing he had taken all he would ever need.

One person can cover but a small portion of the earth's surface during a lifetime, and one can expect to collect personally but a

small per cent. of the grand insects known. But by exchange the treasures of distant lands may be accumulated and the pick of the lepidoptera of the world gathered in one's cabinets.

Timetes is a genus of butterflies easily recognized, the species differing widely in general appearance from others of the *Nymphalidæ*. The lower wings are furnished with long tails, suggesting slightly the *Papilionidæ*.

The coloring in some of the species is very pleasing, rich browns being contrasted with orange and tan, while metallic purple and blue adorn some of them. Many of the kinds are streaked vertically with brown and black. The under side is usually much lighter than the upper. The genus is confined almost wholly to tropical America, and but a few species are reported as occurring within the borders of the United States, and these at the extreme south.



Timetes petreus. Under side.

While my brothers were in Colombia, South America, on the banks of the Magdalena River they found the different species of *Timetes* not uncommon, and captured a good number. They frequented low, open or sparsely wooded districts, and were often seen about the muddy pools in the roads in company with the various species of *Callidryas*. They were not very shy.

Timetes petreus is very angular in outline, at first sight giving one the idea that some one had tried the experiment of seeing what a grotesque creature he could manufacture. The upper wings have a slight resemblance to those of *Grapta*. The tails are long, and blunt at the ends. The colors of the wings are dark reddish orange streaked and margined with black. The under side is light brown of various shades tinged with pink. The body and a narrow band along the inner margin of the lower wings is light buff.



Timetes coresia. Male.

One of the most strikingly colored species of this genus is *Timetes coresia*. The upper side is a rich dark brown deepening to black in a band across the middle of each wing, with a lighter reddish brown space along the outer margin of all four wings. In strong contrast to this dark coloring is the very light under side. The inner half of the wings is almost pure white with two or three faint lines of brown crossing them. The outer half is light brown and buff with an irregular reddish brown band following the outline of the white area across the wings. This butterfly is not at all common, and one

rarely sees it in small collections of tropical American insects, but doubtless, like so many creatures which are considered rare, it is abundant enough in certain localities at certain seasons.



Timetes chiron.



Timetes chiron. Under side.

A species of this genus, which is not rare within the borders of the United States, and which in Central America may be taken in

numbers, is *Timetes chiron*. The wings are brown, streaked vertically with heavy black bands, and with a few light dots upon the outer third of the upper wings. The body is black and dark brown. On the under side the color is much lighter, particularly the inner half of the wings, which is light gray with a pinkish tinge streaked with lines of tan and bordered outwardly with a wide band of creamy white. The outer half of the wings is light purplish brown with numerous vague lines and markings of tan, purple and bluish black. The body is creamy white below. This insect may be found in Florida and Texas.

A group of small but highly colored butterflies comprises the genus *Callicore*. The upper surface of the wings is usually velvety black, sometimes with deep purple or blue reflections to be seen in certain lights. Bars of brilliant shining blue or purple usually cross



Callicore clymena.

both wings. The under side is totally different from the upper, bright vermillion or deep pink usually occupying the greater part of the upper wings, while the lower pair are white or light gray and adorned with curious lines and markings, which in several of the species look like rude figures and letters.

Tropical America is the home of this genus, and at the end of the wet season the muddy roads through the luxuriant forests are often enlivened by the brilliant patches of color displayed by groups of these little butterflies at rest sipping the moisture from the pools. When disturbed they rise in a little cloud, displaying the deep red and flashing blue as they flit about, making an animated and highly colored picture.

Although several kinds of these interesting butterflies inhabit Mexico and Central America, but one species is found within the United States. This is *Callicore clymena*, and, like most of the others of this group of butterflies, it is a bright and pretty insect. The upper surface is deep black with a wide band of satiny bluish green crossing the upper wings diagonally, with a line of the same color following the outer margin of the lower wings. A few scattering blue scales are usually to be seen next the base of the upper wings, and a small white spot is located near the upper angle. The body is black. On the under side the upper wings from their base outward are crimson for two-thirds of their area. This color is margined outwardly with a heavy black band, beyond which are two light gray lines and two black lines occupying the triangular space at the point of the wing. The lower wings are light gray, in some specimens brownish gray. These are marked in the characteristic manner of the genus with black lines and figures which resemble clumsily made letters or numbers, the general character of which can be best understood by reference to the accompanying illustration.



Callicore clymena. Under side.

The upper margin of the wings is adorned with a band of crimson. The body is gray beneath; the antennæ are black tipped with yellow.

This butterfly is very common in Mexico, Central America and Colombia, and my brothers took many specimens in the latter country while there. They were frequently seen in clusters on the dark mud on the banks of streams resting with their wings spread. They were not shy, but when disturbed rose a short distance above the ground, and flew about in a confused manner. The only locality where

this insect is found within the borders of our country is in the southern part of Florida.

The genus *Eunica* contains many very richly colored butterflies of medium size. The ground color is often deep black or brown with bars or patches of rich shining blue or purple in some species,



Eunica monima. Upper side.

while in others the blue or purple extends almost over the whole surface of the wings when the insect is held in certain lights. The under side is often prettily colored with different shades of brownish gray tinged with pink or purple, relieved with spots and markings of deep brown or blue black.



Eunica monima. Under side.

These insects are numerous both in species and individuals in tropical America, where they often congregate on the muddy banks of streams during the hot, quiet hours of the morning. They are not very swift flyers, and the native collectors of Colombia capture large numbers of them. Even in small collections from that country one

will often see the rich blue and purple of several of these insects among other butterfly habitants of that tropical land. Their scales are very easily loosened and their coloring is so dark and rich that a slight touch on the wings with the fingers will seriously injure a specimen. The native Indian collectors are very careless in their manner of handling the insects they capture, and it is sometimes enough to make one's heart ache to see some rare and gorgeous little creature, that would delight a collector and pay him for a day of hard exertion, ruined by the clumsy finger-marks of its Indian captor, who simply looked upon this specimen, with hundreds of others, as a means of purchasing a keg of rum.

Our own native species, *Eunica monima*, is a rather plain insect, being brown above with slightly purple reflections, while beneath it is brownish gray tinged with pink, having a few faint yellowish spots on the upper wings and faint lines of brown on the lower pair. It is occasionally taken in southern Florida.



Eurema lethe.

Another straggler from tropical America, which is occasionally found north of Mexico in Texas, is *Eurema lethe*.

The genus to which it belongs is not a large one, and is mostly confined to Central and South America. This insect is marked in a bold manner, and, although not displaying the iridescent tints of many of the butterflies from the same region, it is rich in coloring.

The ground color on the upper wings is brownish orange with heavy black bands. The lower pair are of a darker shade with spots and markings of black. The body is brown with a slightly greenish tinge on the thorax. Beneath the ground color of the upper wings and the upper half of the lower wings is buff yellow, the lower half



Eurema lethe. Under side.

being wood brown. Over both sets of wings are numerous brown markings, the general character of which may be readily understood by reference to the illustration. The insects from which these figures were made were taken in Colombia by my brothers. The butterfly is a strong and rapid flyer, having a stout thorax with powerful muscles for the rapid movement of the wings.

Another genus of butterflies, whose home is tropical America, is *Anartia*. There are but three or four species belonging to this genus, and but one inhabits the southern part of the United States. These insects are of medium size and plain in colors, though not without a certain beauty.

Our native species, *Anartia jatrophae*, is light gray with brown and black markings and spots, and having a reddish or yellowish brown double row of crescent-shaped spots following the outer margins of both sets of wings. Individuals vary a good deal in intensity of coloring, some being almost white in ground color, the outer margins of the wings being yellowish, while others are dark brown along the margins, with but little red or yellow. The under side is light creamy white shading to gray, with pale bars of brown and the

round black spots of the upper side. A red line follows the shape of the wings a short distance in from the outer margins, and several



Anartia jatrophæ. Male.

other red lines accompany the brown markings on both sets of wings. A faint ring of red surrounds the black spots on the lower wings.



Anartia jatrophæ. Female.

The illustrations will give a better idea of the insect than any description. The sexes differ a good deal in size, but are otherwise marked much alike.

This insect is very common near the city of Para, at the mouth of the Amazon. Here it inhabits grassy districts, and when alarmed rises but a short distance above the grass tops in its



Anartia jatrophae. Under side.

flight. It is slow on the wing and is not difficult to capture. It is found within the borders of our country, in southern Florida and Texas.

Junonia is a genus containing some very prettily marked and spotted butterflies. Most of the species are found within the tropics both of the Old and the New Worlds.

One of the handsomest species of this genus is *Junonia cænia*. It varies a good deal in coloring, especially on the under side, which in some specimens is a yellowish gray and in others a maroon gray. Also in the size of the eye-like spots of the upper side there is a good deal of variation. This insect is sometimes found as far north as Massachusetts, numbers having been taken the last two seasons in the town of Medford in that State. In the south and west it is sometimes very abundant, and I have seen it near Stockton, in California, during July, one of the commonest of butterflies. It haunts open fields, and among the low flowering plants it delights to sport. Although a good flyer, it is not very shy. The caterpillar is dark, varying from brown to brownish purple, darker on the back, and having pale stripes on the sides. It is adorned with numerous branching spines along the sides and back. It feeds on the leaves of the plantain.



UPPER SIDE



UNDER SIDE

JUNONIA COENIA

The chrysalis is stout and somewhat angular, having spines along the back of the abdominal part. It is usually brown in color, sometimes yellowish brown, with the tips of the spines reddish.



Junonia genoveva. Male.

In the extreme southern part of the country is found another species of this genus, *Junonia genoveva*. The insect is a good deal darker than *Junonia cenia*, but is otherwise marked much like it.



Junonia genoveva. Male. Under side.

The ground color of the wings is dark brown, and in some specimens a dark greenish shade is noticeable, particularly on the lower wings. I have never seen the insect alive, and the specimens here figured were taken in Colombia, South America, by my brothers.

Another form, *Junonia lavinia*, is lighter in general coloring than either of the preceding, but is marked very similar to the last named species. The upper wings are more pointed, and the lower pair have more prominent points on their outer margins than our other native species.



Junonia genoveva. Female.

Some of the most beautiful as well as the most widely distributed and best known butterflies are included in the three genera of *Pyrameis*, *Vanessa* and *Grapta*.

In *Pyrameis* the wings are scalloped, but not angular, the larvæ are armed with branching spines, and they live a solitary life within a rolled leaf. The chrysalides are angular on the sides, and on the back of the thorax is a sharp ridge. Rows of small tubercles follow down the back of the abdomen. The chrysalides are often objects of great beauty, looking as if made in part or wholly of gold, and highly polished. This brilliant coloring is gradually lost as the time for the hatching of the butterfly draws near.

A very pretty butterfly is *Pyrameis atalanta*, and the bars of orange red on its dark wings make it a very conspicuous object, and one of the first to adorn the cabinet of the young entomologist. It frequently hibernates over winter and is among the earliest butterflies to make its appearance in the spring, though such specimens are usually very much faded and worn and look as if the frosts of winter



UPPER SIDE



UNDER SIDE

PYRAMEIS ATALANTA

had bleached them. The insect is said to hibernate in the chrysalis state also, but I have never been able to find the chrysalides in winter.

The first brood usually hatches in July, while the second begins to come out in September, and specimens may be seen from then on till it is too cold for them to fly. They are very partial to decaying



Chrysalis of *Pyrameis*.

sweet apples or pears, and when contentedly sucking the half fermented cider are easily approached and captured. Rum and molasses, the same bait used for moths, is attractive to this insect, and one may sometimes see several of these butterflies at a time about the bait, especially if there are no strong smelling flowers or decayed fruits near. An over-ripe banana split in halves is an excellent bait for this and several other allied butterflies.

The coloring of the under side of the wings is protective, and when the insect has alighted on an old rail or the trunk of a tree with its wings closely pressed together it is a difficult object to see. Its flight is strong and rapid, and although so bright an object while on the wing it is abundantly able to take care of itself. Mr. Harris, in his "Insects Injurious to Vegetation," gives a very well written account of the habits of this insect in its larva state, which I have thought best to insert here. He says: "The *atalanta* butterfly was probably introduced into America from Europe with the common nettle, which it inhabits. It deposits its eggs in May upon the youngest and smallest leaves of this plant, being cautious to drop only one upon a single leaf. The young caterpillar is guarded against injury from the poison prickles of the leaf by the numerous branching spines with which it is covered, and which, being longer than the prickles, prevent its body from coming in contact with the latter. The head is covered with a tough shell, which sufficiently protects this part, while its strong and horny jaws are adapted for cutting and chewing the leaves and their prickles with impunity.

As soon as the caterpillar is hatched, it spins a little web to cover itself, securing the threads all round to the edges of the leaf, so as to bend upwards the sides and form a kind of trough, in which it remains concealed. One end of the cavity is open, and through this the caterpillar thrusts its head while eating. It begins with the extremity of the folded leaf, and eats downwards, and, as it gradually consumes its habitation, it retreats backwards, till at last, having, as it were, eaten itself out of house and home, it is forced to abandon its imperfect shelter, and construct a new one. This is better than the first, for the insect has become larger and stronger, and withal more skilful from experience. The sides of the larger leaf selected for its new habitation are drawn together by silken threads, so that the edges of the leaf meet closely and form a light and commodious cavity, which securely shelters and completely conceals the included caterpillar. This in time is eaten like the first, and another is formed in like manner. At length the caterpillar having eaten up and constructed several dwellings in succession, and changed its skin three or four times, comes to its full size, leaves off eating and seeks a suitable place in which to undergo its transformations. The young caterpillars are almost black; the full-grown ones measure about one inch and a half, are generally of a brown color more or less dotted with white, with a black head, rough with elevated white points, with white branching spines on the back, and on each side there is a row of yellow crescents. The chrysalis is gray, with a whitish bloom upon it like that on a plum, and the little pointed tubercles on its back are gold colored. The chrysalis state continues about ten days, or longer if the weather be cool and wet."

The caterpillars of this butterfly are frequently so abundant as to almost strip the leaves from the nettles, and being protected as they are from the sight of their enemies one would naturally think that their chances of life in the struggle for existence were very good. However, if a number of the full-grown larvæ are collected and examined, one will soon see the eggs of the ichneumon flies, for these parasites have very sharp eyes and even in his curled-leaf home the caterpillar of *Pyrameis atalanta* is not exempt from the fate that awaits ninety-nine one-hundredths of his relatives of other species.

A butterfly having almost a world-wide range is *Pyrameis cardui*. This insect has succeeded in establishing itself over Europe, Asia, a good part of North and South America and the Sandwich Islands,

and varieties or closely allied forms are found in New Zealand and Australia. It does seem strange indeed in a land where the trees, flowers, birds and mammals are all new to one and where every few steps bring one in contact with something never before seen, to suddenly come upon a bright little butterfly as well known as the faces of one's near relatives, and looking, like the other inhabitants of the country, perfectly at home. It is like meeting a friend of one's childhood in a distant land.

The insect is double-brooded in our latitude, the butterflies of the first brood making their appearance early in June and others later in August. Flowers are very attractive to this insect, and in favored seasons a patch of the second growth of clover will be found a good hunting ground for them. They are agile and restless creatures, seldom remaining long in one spot, and flying very rapidly when once alarmed. In neglected pastures, where thistles, the food plant of the larva, abound, one may usually look for this insect with good prospects of finding it plentiful. The species is very common in Tennessee, and the largest and finest specimens I have ever seen came from that State. In fact, those from which the transfers for this work were made are from that region.

Besides the thistle the caterpillar feeds on the leaves of the burdock and sunflower, and with silken webs curls over the edge of the leaf beneath which it lives and feeds, finally, as in the preceding species rendering its home uninhabitable and constructing a new one. The caterpillar is dark brown or black striped with yellowish brown on the sides, and is armed with many branching spines of a gray color tipped with black. The chrysalis, which is often suspended from the under side of a leaf of its food plant, is an exceedingly beautiful object, being brown or purple brown with spots of burnished gold on its sides and back, and looking more like a jewelled ear-ring than the nymph of a butterfly.

Another butterfly closely related to the preceding and looking much like it in all three stages of its existence is *Pyrameis huntera*. In habits it also much resembles *Pyrameis cardui*, while the caterpillar feeds on the same plants. When fresh and perfect this is one of the most beautiful of butterflies, the rings and lines on the under side of the wings of delicate tints being arranged in a very pleasing manner. This insect is found over all of temperate North America, and with *Pyrameis cardui* and *Pyrameis atalanta* is frequently seen in the fields of clover and on the blossoms of the thistle.

A very curious form of this species was captured in Dover, Mass., in August of 1898. This specimen is now in my possession and a figure of each side of it is here given. The colors above are



Pyrameis huntera.

streaked and run together and beneath the wings are almost white on their outer portion. Unfortunately the specimen was damaged before it reached me. What could cause such a variation in the



Pyrameis huntera. Under side.

color and markings of a single individual it is difficult to say. Such variations are rare, but in catching hundreds of specimens they now and then come to the net of the collector.



UPPER SIDE



UNDER SIDE

PYRAMEIS HUNTERA

In the genus *Vanessa* the insects are of medium size, and their wings are notched or somewhat angular in outline. They inhabit the temperate regions of the earth and are strong and hardy butterflies, frequently withstanding the rigors of a semi-arctic winter in a torpid state and reappearing the first warm days among the earlier harbingers of spring.

The *Vanessa antiopa* is one of our commonest and best known butterflies, and, from the ease with which the larvæ are gathered and reared, it is one of the first insects with which the beginner is likely to become acquainted in all its stages.

The butterflies, very worn and faded, make their appearance early in the spring, coming out from their winter quarters, where they have hibernated among heaps of stones, beneath the loosened bark of decayed trees, etc., frequently before the snow has left the ground in the forests.

The females lay their eggs in clusters on the twigs of the poplar, elm and willow and on hatching out the dark colored, spiny larvæ live a gregarious existence until they are full grown, when they separate and, descending the tree on which they have lived, suspend themselves by the posterior legs to a mat of silk spun beneath the projecting point of a rock in a stone wall, or under the top board of some fence, to await their transformation to the chrysalis state. These larvæ frequently damage the shade-trees in our suburban towns to no small extent.

The larva when fully grown is dark brown in color with a row of red spots running down the middle of the back. It is covered with formidable branching spines, and the caterpillars are often clustered together on a branch in such a mass as to make it bend down with their weight. One will often see the sidewalks sprinkled with their droppings, the branches overhead being stripped of their leaves by these insects.

The chrysalis is angular and spiny, of a brown or purple brown color, with rows of reddish colored tubercles on the back of the abdomen.

If one wishes to watch the transformation from larva to chrysalis and from chrysalis to butterfly, there is no insect, to my knowledge, where the whole process is so easily studied. The caterpillars may be procured by the hundred when nearly full grown, and by putting them in a roomy box with a few handfuls of fresh leaves one will have the satisfaction of seeing them attach themselves to the cover

within a few days from the time they were gathered. Their change to the chrysalis state is an interesting operation, and by placing the box cover in a horizontal position, where one can watch it from below, the minutest detail in the process may be watched with ease. Then, too, one has not long to wait for the butterflies to hatch, and in this way a fine lot of perfect specimens is assured.



Chrysalis of *Vanessa*.

On emerging from its chrysalis the butterfly voids a red colored liquid which looks somewhat like drops of blood. As many of these butterflies and allied species frequently hatch at about the same time, the sprinkling of this red liquid on the streets and houses of towns has given rise in olden times, among the superstitious inhabitants, to stories of showers of blood which were supposed to foretell disasters or wars.

This butterfly inhabits Europe, and is supposed to have been introduced into America from there. It is not common in England, and the collector there capturing a fine specimen considers he has taken a prize.

A much smaller but bright and attractive butterfly is *Vanessa milberti*. It is a much more northern species in its range than the preceding, being rarely found in the southern or middle portion of the United States. It is, however, common in northern New England and Canada, and, like the preceding, makes its appearance early in the spring and again later in the summer.

The larva, which is dark and covered with short spines, feeds on the nettle and leads a gregarious life in the earlier part of its existence. The butterfly is a wary and agile little creature, frequently opening and closing its wings in a sudden and nervous manner while at rest, as if it were impatient to be off. The under side, like that of *Vanessa antiopa*, is protective in coloring, rendering it difficult to see until it opens its wings. It is rare at my home in Wellesley, and we



UPPER SIDE



UNDER SIDE

VANESSA ANTIOPA



UPPER SIDE



UNDER SIDE

VANESSA MILBERTI

seldom take more than two or three specimens in a season, but I have obtained many fine ones from Ontario, Canada, where a friend rears them from the egg. An allied species of about the same size is found plentifully in the foothills in northern California. This is *Vanessa californica*, and it much resembles the European form *Vanessa polychloros*.

To the genus *Grapta* belong several butterflies inhabiting Europe and America, whose wings are very angular in outline and bear near the centre of the lower pair on the under side a silvery mark, suggesting in some instances a letter or a figure. From these rather fancied resemblances some of the species have received their names. These butterflies are of medium size and handsome in coloring, being mostly some shade of orange or reddish brown with black or brown markings. The outlines of their wings, too, like the lines of a fast sailing vessel, suggest speed, for they are very active creatures and even while at rest look alert and ready to take wing the instant danger threatens. They are very common in Canada and in the northern and middle parts of the United States.



Grapta interrogationis.

Grapta interrogationis is one of the largest of this group of insects and is certainly one of the finest and an ornament to any cabinet. There are two well-marked forms, which are so different in color as to quite puzzle one at first. The most common form is

reddish orange on both sets of wings with deep reddish brown or pinkish brown mottlings extending along the outer portions, which



Grapta interrogationis.

are edged with purple on their outer margins. The wings bear several black spots. The under side is light reddish brown with a few faint brown lines.



Grapta interrogationis.

With the other form the upper wings are much the same as in the form just described, except that they are usually somewhat darker along their edges and often lack the purple or violet margins.



UPPER SIDE



UNDER SIDE

GRAFTA INTERROGATIONIS

The lower wings, however, are quite dark, being almost black except near their base, while the under side of the insect is frequently dark purplish gray with wide irregular bands of brown.

The silvery spot is quite conspicuous in this form, as the dark color surrounding it brings it into prominence.

There are two broods in a season, one in June, and the other, which is much the larger, in September. The butterfly frequently hibernates during the winter, and, like *Vanessa antiopa*, makes its appearance early in the spring.



Grapta interrogationis. Under side.

The caterpillar is brown with light yellowish mottlings, and a yellow stripe low down on each side. The branching spines with which its body is armed are yellowish tipped with black. It feeds on the hop, and in some localities does considerable damage. The elm is also attacked by it, particularly the young trees, but I have never seen it in sufficient numbers to do them any great injury.

The chrysalis is light brown with a slight purplish tinge and has several silvery or golden spots on the back. It is angular and spiny, with projections like ears on the anterior end, and a sharp ridge at the back of the thorax.

Like many other butterflies, this species is very partial to half-decayed sweet fruits, and is often seen with other kinds in autumn in pear and peach orchards. It is an easy insect to rear in confinement, but greatly subject to the attacks of parasites.

Several other species of the genus *Grapta* are plentiful in the

northern and eastern states. Three of these look so much alike that it is difficult for the beginner to separate them, the differences being most easily recognized from the under side and from the shape of the silvery mark on the hind wing.



Grapta comma.

In *Grapta comma* there are two well-marked forms, as there are in *Grapta interrogationis*. In one form the color of the upper side is

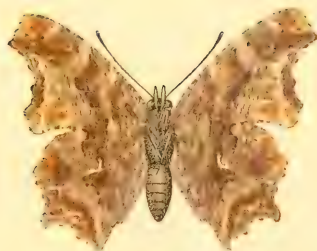


Grapta comma. Under side.

much the same on both sets of wings, being orange with black spots margined with reddish brown, in which are several orange spots, and having a purple gray edge. The under side of this form is usually



UPPER SIDE



UNDER SIDE

GRAPTA COMMA

mottled with gray and dark brown, the brown in some specimens assuming distinct irregular bands, while in others the whole under surface is a plain grayish brown, often having a pinkish tinge.



Grapta comma.

These differences are well shown in the accompanying figures. The silvery spot is usually in the shape of a rather sprawling G. In the other form the upper wings are yellowish tan, while the lower wings are dark brown, showing very few spots. The under side usually is



Grapta comma. Under side.

much lighter than in the first described form. These two varieties are not equally abundant, the last described form, in those I have collected, being in the ratio of about one to six to the former.

The larva feeds on the hop, nettle and elm, and is light yellowish in color, with whitish spines tipped with black. The chrysalis is also light, varying from almost white with gray mottlings to light grayish brown. It has golden markings on its dorsal side.



Grapta comma. Under side.

The habitat of the species is the northern part of the eastern half of our country, but it also extends into the southern parts of Canada. Like other members of the genus, it is a very active butterfly, and while on the wing its movements are so rapid that one can hardly follow its eccentric flight with the eye. If frightened away from a favorite retreat it is almost sure to return in a few minutes, and by stealth it may be easily taken. I have seen it very abundant in northern Ohio in August and September, where it is probably double-brooded. It is frequently found about farms and stables, where the powerful odors probably attract it.

A most beautifully mottled insect on the under side is *Grapta faunus*. The outlines of the wings are more notched, and there is more contrast in the markings of the under side than in any other eastern species of this genus with which I am acquainted. The margins of the wings above are dark, and the spots are heavy and large in proportion to the size of the wings. The under side is brown and gray with several sharp black lines and a number of vaguely defined green spots. The markings are all very irregular, and the general effect is like a bit of torn and decayed bark. Mr. Comstock states that "The larva feeds upon black birch, willow, currant and wild gooseberry." I have never seen it, and know nothing

of its colors or habits. The butterfly is much more northern in its range than the preceding species, and seems to prefer mountain



Grapta faunus.

districts. I have taken a good many specimens in the hilly parts of New Hampshire, and it must be abundant in parts of Canada, judging by the numbers I have had sent me from different places.



Grapta faunus. Under side.

Another species of *Grapta* occurring in the northern part of the United States and Canada is *Grapta progne*. The coloring of the upper side of the wings resembles that of *Grapta comma*, but the markings below are quite different, being light brown and gray, without the irregularities of the other species, as there are many fine lines running diagonally across the wings. The silvery mark is thin and

L-shaped, which is perhaps the most distinguishing characteristic. The larva feeds on the elm and gooseberry.



Grapta progne.

The species *Grapta j-album* differs a good deal from other species of this genus, and by some authors is included in the genus *Vanessa*.



Grapta progne. Under side.

It is a fair sized insect, stout bodied and powerful. The coloring is rusty yellow, shading to reddish brown, with numerous heavy black and brown bands and spots. Near the upper angle of the upper wing

is a white spot, and below the middle of the upper margin of the lower wing is another larger white spot. These spots are both



Grapta j-album.

divided into two by a dark vein. The under side is grayish brown,



Grapta j-album. Under side.

having a few lines of black with an irregular greenish line near the margin. There is considerable variation in the coloring of the under

side, as the accompanying illustrations will show, some being almost one plain gray tint, while others are marked with bands of brown, gray and white.

This is a northern species, ranging over the northern temperate parts of the continent. I have never seen the larva, but, according to Mr. W. J. Holland, it feeds on the different species of willow. Mr. G. H. French says, "The chrysalis is one inch long, of a beautiful green color, delicately reticulated, with six golden spots on the back." The perfect insect is sometimes very common, especially in the hilly portions of New Hampshire, where one may take it in



Grapta j-album. Under side.

July in numbers. One of my brothers succeeded in taking several hundred perfect specimens of this species near Madison, in New Hampshire, last season. They were wild and shy, but were quite abundant. They frequented little used country roads, where they usually rested on the damp earth, sometimes several close together. When frightened they flew up and alighted on the trunks of poplar-trees, with their wings folded close together, the gray and brown color of the side exposed to view giving them the appearance of partially loosened pieces of bark. When struck at with a net while on the wing they sometimes feigned death by closing their wings and falling onto the road, with which their colors readily harmo-



Upper Side



Under Side

nized. They would even suffer themselves to be taken up and handled without displaying the slightest signs of life, until suddenly assuming activity they started off at a great speed.



Grapta gracilis.

A species of *Grapta*, of which I was so fortunate as to obtain specimens in the White Mountain region of New Hampshire, is *Grapta gracilis*. It is a small species, rather dark 'reddish above



Grapta gracilis. Under side.

with dark brown or black margins to the wings. On the under side the inner half of the wings is dark brown. This color ends in a sharp and irregular outline, close to the edge of which the white silvery mark is located and brought into strong relief.

Outside of this dark area is a light gray band which blends by insensible degrees into the dark margin of the wings. On close inspection one will see many short, fine brown lines, which look as

if made with the point of a very fine pen, distributed over the greater part of the surface of the under side of the wings. In habits and mode of flight this butterfly resembles others of the genus already described. It often alights on the roads where they traverse woods, and is so active and wary as to make its capture difficult. The species is found in northern New England and Canada, and is generally considered somewhat rare.

The genus *Phyciodes* contains a large number of small and plainly colored butterflies of a tan or brownish orange color with dark brown or black markings. They are found over all parts of our country and are usually among the commonest of butterflies, actually swarming in May and June and again in August and September. So much alike are the different species that a collection containing the many kinds will at first give one the impression that they are all of one or two species with variations. Varieties differing both in colors and markings are common, and where the different species are so much alike, it is scarcely necessary to state that it is at times exceedingly difficult to separate them.

As the many kinds of these butterflies are interesting only to the specialist, I shall not weary the reader with figures and descriptions which must of necessity be very dry and lacking in interest to a lover of the beautiful, the rare and the curious in Nature.

Phyciodes tharos is a very common little butterfly in June and again in August in our fields and meadows, where it delights in the blossoms of the low plants, several butterflies sometimes being seen on one flower. It is slow and feeble in flight. The larva feeds on the plantain, and is dark in color and covered with short bristles.

The genus *Melitea* contains a large number of butterflies of rather small size, which are closely related to *Phyciodes*. They are inhabitants of the north temperate parts of the world, particularly in mountain districts, and the western part of our country is rich in species. The genus is well represented in western Nevada near the base of the Sierra Nevada, where in June several pretty species may be taken in large numbers.

Our eastern species, *Melitea phacton*, is one of the finest of the genus, and is a general favorite with collectors. The color is brownish black with several rows of buff round spots and crescents on the outer half of the wings. Along the outer margins of both sets of wings is a row of brick red spots. The body is black with several small whitish dots along the sides of the abdomen. On the



UPPER SIDE



UNDER SIDE

PHYCIODES THAROS

under side the ground color is not so dark. The rows of light spots are more numerous and the reddish spots along the margins are so close together as to make an almost continuous band. The inner third of the wing is blotched with a number of large reddish spots



Melitæa phaeton.

with light yellow spots surrounded with black rings between them. The body is dark brown below with reddish spots on the abdomen, and the legs and palpi are reddish.



Melitæa phaeton.

This butterfly, although rarely seen except by those who know where it is to be found and are in diligent search for it, is not rare in New England. It is extremely local in its distribution, being found about meadows or swampy districts, and usually in numbers

from a dozen to a hundred in a small space of a few square rods. It is an easily captured species when once found as it is not shy; its flight is feeble and is not long sustained. It rarely comes into the upland fields or gardens. There is but one brood in a season, the butterfly making its appearance about the middle of June, and continuing to fly for about a month. The female lays her eggs in a cluster on the snake head (*Chelone glabra*), and when the caterpillars hatch they spin a web, drawing the leaves together at the top of the plant. In this web or nest they live and feed until cold weather, when they cease feeding, and remain in it in a dormant state throughout the winter. In the spring they again commence feeding, and when their growth is complete, they separate and seek a retreat in which to pupate.

The larva is covered with stiff black bristles, and the chrysalis is gray with dark brown spots.

Many grand butterflies belong to the genus *Argynnis* and several of the finest of the group are natives of the eastern half of the United States, where at certain seasons they are among the most abundant of butterflies.

Many of the species are of good size and very beautiful. The usual color of the wings is reddish tan or brownish orange with sharply defined dark brown or black markings in the shape of irregular lines and spots, while beneath, the ground color is generally somewhat lighter. On the upper wings, except along the outer margin and in the space at the upper angle, the markings of the upper side are repeated, but are less sharply defined. The lower wings and the outer margins of the upper pair are usually adorned with brilliant satiny white spots, which look as if made of silver and highly polished.

In a few of the species the males and females differ greatly, but in the majority of kinds they are much alike.

According to Mr. Comstock, "More than fifty species occur in America north of Mexico." Many kinds resemble each other closely, so that they are at times very difficult to separate. Mr. Holland, writing of this genus, says, "Owing to the fact that there is a great tendency in many of the forms closely to approximate one another, the accurate distinction of many of the species has troubled naturalists, and it is quite probable that some of the so-called species will ultimately be discovered to be merely local races or varietal forms."



Male.



Female.

ARGYNNIS IDALIA.

The caterpillars are covered with fleshy spines and bristles. They feed upon the different species of violets, and are nocturnal in their habits, hiding by day. Many of the species hibernate over winter in the young larval state and resume feeding the next spring. The chrysalides are slightly angular with rows of blunt tubercles on the dorsal side. They are frequently light reddish brown or pinkish brown in color, and some are adorned with spots of yellow and dark brown.



Argynnis idalia. Under side.

The number of species of this genus to be found in the western portion of this country is very great, but none of the forms from the far west are to my thinking the rival in beauty of our own richly colored *Argynnis idalia*. In the female the upper wings are reddish orange with heavy black margins and spots, and have a row of cream colored spots extending along the outer margin. The lower wings are black with a purple tinge, except on the upper portion, which is yellowish brown. Two rows of large cream colored spots adorn the wings, while a row of narrow elongated spots follow the fringe on the outer margin of both sets of wings. Beneath, the upper wings are a little lighter and more reddish, with the black markings less distinct, while along the upper and outer margin are several silvery white spots enclosed in rings of black.

The lower wings are brown with many large creamy spots, having a satiny lustre, arranged in irregular rows across them. These spots are also enclosed in rings of black. The male resembles the female except that it is smaller and generally lighter, and the outer row of spots is reddish orange instead of cream color.

This, our largest and handsomest *Argynnis* in New England, is found during the latter part of July and the first of August in low meadowy districts, where its favorite flower, the wild flax, as it is sometimes called, or the swamp milkweed, lives. In exceptional seasons this insect is plentiful, and one may see one or more of these large and richly colored flies about every clump of its favorite blossom. It sometimes visits the upland fields of clover and occasionally the flowers of the garden. It is a wild insect and a strong flyer, and when once alarmed it will tax the wind and endurance of a good runner to overtake it.

The insect is found throughout New England and the middle and western states, as far west as Dakota. The finest specimens I have ever seen came from Illinois, and their richness of coloring and size made them well worth the trouble of capturing.

In the mountainous districts of Virginia, Carolina, Tennessee and Arkansas is found the most magnificent species belonging to the genus *Argynnis* which inhabits this country. This beautiful butterfly is *Argynnis diana*. In size there are few species of the group in the world which equal it, and but one or two with which I am acquainted which rival it in beauty.

In the male insect the inner portion of each wing is a rich dark brown bordered by a wide band of tawny orange, across which run several narrow lines of brown, between which are round brown spots. The under side, especially on the lower wings, is a good deal lighter where the large area of dark brown gives place to light brown, while on the upper wings the same area is black with several tawny orange markings. Two lines of elongated silvery spots cross the lower wings, the line near the outer margin being the more distinct. The female is often a good deal larger than the male and in coloring is totally different, the ground color of the wings being a rich greenish or bluish black. The outer portion of the fore wings is crossed by three rows of bluish white spots, while the same portion of the lower wings has one row of large blue spots, each enclosing a round black spot, and one row of elongated bluish white spots near the outer margin. The under side of the female is brown with the



UPPER SIDE



UNDER SIDE

ARGYNNIS IDALIA



Male.



Male. Under side.

ARGYNNIS DIANA.

lower wings somewhat lighter, which are marked with blue and black spots. A few silvery crescents are to be seen on the lower wings along the outer margins. The female is much the more striking insect of the two, and its size and rich dark color make it a conspicuous object while on the wing.

This insect, particularly the female, has been until quite recently, a rare insect in collections, and has brought high prices. Even at present, when its habitat is well known and many of these fine but-



Argynnis diana, Female.

terflies are taken every season, it is still an uncommon insect to see in any but large collections. It is an active and wary butterfly and as it is usually found in very hilly regions, the successful collector is likely to have many a spirited chase for it.

The inhabitants of the regions where it is found in Kentucky, have by this time become familiar with the sight of an able-bodied man going about with a butterfly net, but a few years ago a man could scarcely invent a way in which to make people regard him with more suspicion.

This insect makes its appearance in July, and is sometimes seen in some abundance. The females are much less common than the males. A collector friend of mine who had never seen this insect alive, was out with a net one day in Western Virginia, and came suddenly upon three of these fine insects, two males and one female, in the road. They immediately rose in the air and circled about him, while my friend was so much surprised and so fearful, that they would leave if he made the least motion, that he stood like a statue not daring to make a strike lest he should miss, until they were well out of his reach.



Argynnis cybele. Male.

Argynnis cybele is also a large and very handsome butterfly. The sexes generally differ a good deal in size, the male being the smaller, while its markings are less heavy, and the ground color is lighter and more reddish. On the under side, too, the female is darker than the male, the silvery spots showing to better advantage.

During July this insect is one of our most abundant species, frequenting flowering plants growing in meadowy land, particularly the swamp milkweeds, on the pink clusters of which one will often see two or three of these fine butterflies.

It is a swift flying insect but does not seem to be shy when feeding.



UPPER SIDE



UNDER SIDE

ARGYNNIS CYBELE

This insect is one which is nearly always plentiful during its season, and does not seem to have its seasons of scarcity like so many species. The western species seem to be finer and larger than those found in the east, and the flowers along railroads or on the banks of rivers may almost be said to swarm with it at times. The larva is dark colored and spiny, and like others of the genus lives on violets, feeding by night and hiding close to the



Argynnis cybele. Female.

roots of the plant during the daytime. The half-grown larva passes the winter in a dormant state and completes its growth the next spring.

This butterfly has a rather wide range, being found in the eastern, middle and western states as far west as the great plains and north into Canada.

Closely related to *Argynnis cybele* is *Argynnis aphrodite*, and at the first glance the two species would be thought the same. The latter, however, is smaller and usually somewhat darker and richer in coloring. This darker coloring is best seen from the under side.

The yellow band following the outer margin of the lower

wings beneath is narrower in this species than in *cybele*, a characteristic by which the two species can be readily distinguished. The females are occasionally very dark beneath, the lower wing being chocolate brown and the silvery spots looking like discs of the pure metal highly polished.

In July and August this butterfly is at times plentiful, but I have never seen it so abundant as *A. cybele*. It seems to be more northern in its range, and one of my friends living in Ontario, Canada, has sent me many fine specimens. In habits it much resembles the preceding species.

Argynnis alcestis is about the size of *A. aphrodite* and much resembles it. The coloring is dark and rich, and the yellow band along the margin of the lower wings is wanting. Specimens are occasionally taken which are very red beneath on the basal part of the upper wings. I have never seen the insect abundant, but have taken it near Chicago, Illinois, in July, where I was given to understand by a local collector, it was at times very common. The specimens taken there were very fine and well repaid the stop of a few hours for their capture. This is a western species occupying the upper part of the Mississippi valley.

A butterfly smaller in size, but scarcely less brilliant in coloring beneath than *A. aphrodite* and resembling it a good deal, is *Argynnis atlantis*. Although there is often a good deal of difference between the males and females of this species in the intensity of their coloring, the female being the darker, in size they are about the same, and one rarely sees the discrepancy in size so noticeable in *A. cybele*.

This butterfly is abundant in the hilly parts of New Hampshire early in July, where it may be seen on the flowers and bushes by the roadside or winging its way across the upland meadows. It is quite common about Sunapee Lake, where many of the specimens for the illustration of this work were obtained.

Like the other members of this group, the larva feeds on violets, and hibernates when half-grown through the winter. There is but one brood in a season. It is a rather northern species and only inhabits the middle and southern states along the ranges of mountains. It is common in Canada.

A very common little butterfly during May and again in August, in the meadows and swampy lands, is *Argynnis myrina*. It resembles the larger species of the genus in the tawny orange

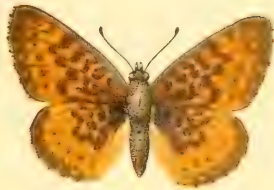


UPPER SIDE

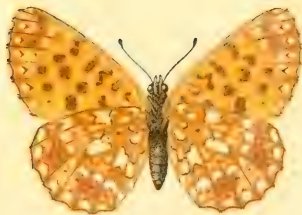


UNDER SIDE

ARGYNNIS APHRODITE



UPPER SIDE

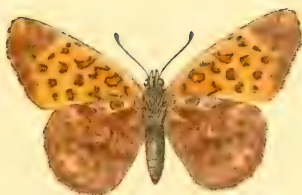


UNDER SIDE

ARGYNNIS MYRINA



UPPER SIDE



UNDER SIDE

ARGYNNIS BELLONA

color of the wings and the silvery spots on the under side, but is a weak little creature, its flight being slow and feeble. It is usually very common in its season and may be seen clustered on the flowers to which it is partial, or flying lazily just over the grass tops of the damp meadow. On a small patch of meadowy land they fly back and forth, not often venturing far from it onto the high land.

The species is double-brooded, and inhabits the northern part of our country and Canada. It is a pretty little insect, as will be seen by reference to the transfer. The specimens for this work were taken in and about Wellesley, Mass., where it is usually very abundant.

Another species much resembling *A. myrina* in size and general markings, but differing from it in not having the silvery spots beneath, is *Argynnis bellona*. This little butterfly is also very abundant and an inhabitant of the same character of country as the preceding species, where it may be taken at the same time of year.

Curiously enough, however, the two species do not mingle to any great extent and they will seldom be found equally numerous in the same meadow. This is often quite noticeable when two small patches of low wet land are divided by a ridge of high ground; one species may occupy one patch and the other the next, each keeping pretty well to itself. This is also a slow and weak flying insect, keeping close to the grass tops while on the wing and seldom venturing far from the low meadows. It is double-brooded like the preceding, and is found over the northern half of the United States east of the Rocky mountains. It also occurs in Canada.

Argynnis montinus is a rare little insect found on the barren tops of the White Mountains in New Hampshire.

It much resembles *A. myrina*, except that it is darker and more reddish. The under side of the under wings is not adorned with the brilliant silvery markings of *A. myrina*, but with irregular white markings on a reddish brown ground.

I have never been so fortunate as to see this butterfly alive, and although I visited Mount Washington and the other peaks near in the hopes of finding it, I was unsuccessful.

This butterfly is supposed to have been stranded on the high peaks of the White Mountains at the end of the glacial period in

much the same manner that the presence there of *Chionobas semidea* is accounted for.

Of the genus *Euptoieta* we have but one species in the United States. It is a southern insect and rarely gets as far north as New England. The insects of this group are rather plain yellowish brown butterflies, with brown and black markings, having no silvery spots on the under side, and in this respect showing a strong contrast to most of the species of *Argynnis*, their near relatives. Their larvæ are adorned with rows of short black branching spines, the ones near the head being the longest and are directed forward. They feed on the leaves of the passion vine.

Euptoieta claudia is a medium sized butterfly, very plentiful in the south and southwest, where it flies in open fields and along the edges of forests. It is very abundant in Arkansas, where along the White River I have captured many specimens in the latter part of July. The larva of this species is brownish orange striped with brown and spotted with white on the back. The chrysalis is light gray spotted and streaked with black. The insect is an inhabitant of both North and South America, and is often seen in collections from Brazil.

To the genus *Agraulis* belong some exceedingly beautiful butterflies of medium size. They are insects loving warm climates, and are very abundant in the tropical and subtropical parts of America. Their coloring above is tawny orange or reddish orange marked with black, while below it is lighter, in some species having a decided pink tinge near the base of the upper wings, while many brilliant silvery spots adorn both sets of wings. The larvæ are armed with branching spines, and they feed on the various species of the passion vine.

But one species occurs within the borders of this country. This is *Agraulis vanillæ*, and one may search a good while before finding a handsomer insect. It is not difficult to capture, flying leisurely from flower to flower in search of honey. It is very abundant at times in the southern states, coming as far north as Virginia and the southern part of Illinois. It is also found on the Pacific coast in southern California. The larva is light yellowish brown striped with dark brown and covered with black branching spines. It feeds on the passion vine.

The genus *Colænis* has very long and narrow upper wings, resembling in this respect the genus *Heliconia*. The insects are mostly brownish orange, but one very beautiful species, *Colænis dido*, is

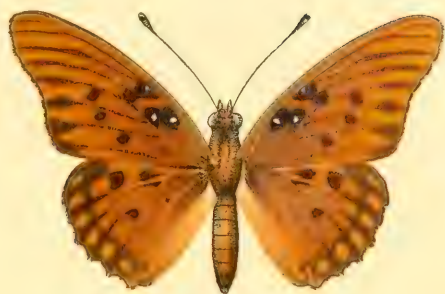


UPPER SIDE



UNDER SIDE

EUPTOIETA CLAUDIA



UPPER SIDE



UNDER SIDE

AGRAULIS VANILLAE



Upper side.



Under side.

COLÆNIS JULIA.

green and dark brown. They are inhabitants of tropical America and the West Indies, and but two species range as far north as southern Texas. The more strikingly marked of these is *Colenis julia*, of which figures are here given. It is brownish orange, and sometimes, when fresh and perfect, almost red. The wings are margined with black, and a bar of black extends diagonally across the outer and upper portion of the upper wing. Beneath it is tan or rust color with a few darker shades. One or two faint red spots are located near the base of both wings.



Colenis delila.

Our other native species, *Colenis delila*, closely resembles the preceding species, but is without the black markings across the wings, and is paler in coloring. These two insects are very abundant in Mexico, and one rarely receives a box of butterflies from that country which does not contain several specimens.

The genus *Danaïs* comprises a large number of good-sized butterflies inhabiting almost all portions of the world. Many of the grandest species are natives of southern Asia and the Malay Archipelago. The ground color of these insects is often brownish orange or reddish brown, while in some of the handsomer species it is green or blue. This color is usually diversified with bars and lines of black, these frequently following the veins and margins of the wings. These butterflies are supposed by naturalists to be protected from their enemies by a rank odor and a bitter taste, so that they have been in a large measure exempt from the attacks of birds and other

insect-eating animals. On this account they fly boldly forth, making little or no effort at concealment.

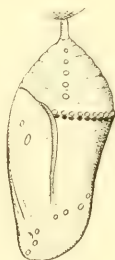
These protected insects have been the subjects of unconscious imitation or mimicry by butterflies belonging to other groups less favored by nature, and many of the species are so exactly copied both in coloring and also in habits as not only to deceive the birds but also the collectors.

One of our largest and best known butterflies belonging to this genus is *Danaïs archippus*. The larva feeds on the milkweed, and is



Larva of *Danaïs archippus*.

a prettily marked creature, being banded transversely with black, yellow and green, and having two long black fleshy horns or filaments at either end of the body. It is easily reared in confinement, and the chrysalis, which is translucent pea green relieved with a line of black dots across the back and rows of circular spots of burnished gold



Chrysalis of *Danaïs archippus*.

about the thorax and along the sides, is an object rarely equalled for beauty in art or nature. The butterfly makes its appearance about two weeks after the chrysalis is formed, the color of the wings being plainly visible through the thin chrysalis shell for a day or two before



UPPER SIDE



UNDER SIDE

DANAUS ARCHIPPUS

it emerges. When seen in the sunshine in the height of perfection, the wings show pleasing iridescent tints varying from green to blue and purple, or even red. This insect is rarely seen in the northern part of our country before July, as it is supposed that neither the perfect insect nor the egg or chrysalis is able to withstand the rigors of our winter, and that the first specimens to be seen in our region are migrants from the south. This is not strictly true, for on several occasions both my brothers and I have taken this butterfly early in May in New England, proving that occasionally the insect succeeds in weathering our severe winter either in the chrysalis or mature state.

At times during September or October immense numbers of these butterflies are seen in scattered flocks apparently migrating either in search of food or toward a warmer region. I have never been so fortunate as to witness one of these flights, but from a gentleman residing in northern Illinois, who saw such a migration in 1894, I obtained the following facts: The butterflies were very abundant near Chicago in that year, and toward the last of September they formed immense flocks and might be seen every afternoon streaming in a southeasterly direction. One evening thousands collected on a dead tree near this gentleman's house, completely covering its twigs and branches.

A good many other kinds of butterflies have been known to assemble in flocks of countless thousands, and have even been observed many miles at sea flying high in air.

The geographical range of this *Danaïs* is very great, being now distributed over a large portion of the earth's surface, although it was originally a strictly American species. It is now common in the Sandwich Islands, Samoa and most of the islands of the Malay Archipelago, while it is plentifully distributed over Australia. These distant lands have been colonized by it only within very recent years. This butterfly with many others has been placed in a new genus and given a new specific name within recent years, and now by many collectors goes by the title of *Anosia plexippus*; and right here I wish to write a few words in regard to the scientific names of insects and the changes which are being made by almost every new writer on the subject of entomology. This constant change of name and the almost endless separating of the species into new genera is one of the most senseless as well as the most needless obstacles put in the way of those who desire to acquire a knowledge of ento-

mology. A child begins by hearing the names of a few of the common insect forms about him, and no sooner does he begin to get a little familiar with them than some new book comes out on the subject and he runs up against an entirely new nomenclature, either of genera or species, or both, which is well calculated to discourage the most ardent enthusiast. Better almost any name that shall permanently stand for the species than this constant change. If authors were agreed among themselves one might conclude that there was some system to their madness, but when one author calls an insect *Limenitis disippus*, another *Limenitis misippus*, another *Basilarchia disippus*, and still another *Basilarchia archippus*, it is enough to bewilder and disgust the hungry aspirant for knowledge on the subject. Even the common names have stuck better in many instances than those given by the scientists, and one has often to resort to them to avoid confusion. Let us hope that order will eventually come out of all this chaos, and that those who tinker with the names and classifications may call a halt before they make a separate genus for every species, and the scientific names to each are more numerous than the legs of its caterpillars. In studying exotic insects, especially those from little-known lands, one is spared these changes of names to a great extent, for it is frequently our most common insects which have three or four scientific names. Let us aim to get these names anchored, and when once a name is well established to hold to it instead of following the caprice of each new writer who may have little more to attract attention than a renaming and reclassification of our familiar forms. To be able to glibly articulate long scientific names and to be familiar with the most recent classifications does not constitute a knowledge of natural history. A thorough understanding of the habits of an animal learned through search and observation is of much more value than a knowledge of its most recent name, which may be a very temporary affair.

One other native insect of this genus is *Danaüs berenice*. It is a rather plainly-colored insect, being yellowish brown, sometimes reddish brown, the wings being margined with wide bands of black in which are enclosed numerous small white spots. Several larger white spots adorn the outer portion of the upper wings. The under side is colored much like the upper, except that on the lower wings wide lines of black follow the veins. This insect is very abundant in Mexico, and extends its habitat up into Texas and Arizona.



Upper side.



Under side.

DANAIS BERENICE.

An insect varying slightly in the coloring of the lower wings and having the veins margined with grayish white has been given the name of *Danaïs stigosa*. As these two forms blend into one



Danaïs stigosa.

another by insensible gradations, so that among a dozen specimens all collected in the same locality it may be impossible to state to which some of them belong, one would naturally conclude that they were the same species with slight color variations.

Heliconia comprises many very beautiful insects of medium size, having very long and narrow upper wings, comparatively small lower wings, long bodies, and long, knobbed antennæ. They give off a powerful odor when handled, and on account of their bitter taste are avoided by birds and other insect-eating animals. Their home is tropical America, where they abound in great numbers both in species and individuals, their bright colors of red, yellow, blue and green in sharply outlined patches and bars on a usually black ground enlivening the dark forests, and partly compensating for the lack of brilliant flowers in those regions. Their caterpillars are spiny, and their chrysalides are angular, and, according to various observers, emit a squeaking noise as they bend from side to side when disturbed.

An interesting habit of butterflies belonging to this genus was witnessed by one of my brothers, William Denton, in Colombia, South America. One day, while he was out collecting, he noticed several male specimens of a very handsome species fluttering about a bush by the roadside. These he took with his net, and was about to move on, when other specimens were seen approaching. In a short time he had several more, but still they kept coming to the same bush. This excited his curiosity, and upon carefully examining the bush he discovered a number of chrysalides of the female of this species upon it, the butterflies within being plainly visible and almost ready to burst their shells. The males were already assembling to welcome the females on their emerging from their chrysalides.

Heliconia charitonia is our only native species of this genus, but it is a handsome insect, as one may see by reference to the plate. This butterfly is abundantly found in Mexico and Central America, and occasionally it may be seen in numbers in southern Florida, where it flies lazily in the hot sunshine. Like the different species of *Agraulis*, the larva of this insect feeds on the passion vine.

Two beautiful insects belonging to the genus *Eumenes* inhabit the extreme southern portion of our country.



Eumonia atala.

Eumonia atala is a common insect in southern Florida early in February, where it may sometimes be seen by dozens clustered on the flowering plants. It is usually very abundant near Miami in that state. The wings of this insect are black with streaks of metallic green or blue below the upper margin of the upper pair,



UPPER SIDE



UNDER SIDE

HELICONIA CHARITONIA

while a row of spots of the same color follows the outer margin of the lower wings. Beneath, the color is black, the upper wings plain, while the lower ones are adorned with many brilliant metallic



Eumonia atala. Under side.

green spots, and one large red spot located midway on the inner margin. The head and thorax is black with metallic green streaks, and the abdomen is brilliant orange.

The other species, *Eumonia minyas*, occurs in southern Texas, and is much like the preceding species except that it is larger. I have never received a specimen from this country, those I have having been captured in Mexico.

A very small reddish brown butterfly, adorned with metallic blue spots arranged in irregular transverse rows on the wings, is *Calephelis canius*. It is a native of Florida and the gulf states, and occasionally strays as far north as Virginia. I have never seen the insect alive, and know nothing of its life-history or habits.

*PAPILIONIDÆ.**Whitelings, Yellows, Swallowtails.*

WE now arrive at a large group of butterflies having six well-developed legs, and where the chrysalis is attached to its support, not only at the extremity of the abdomen but by a thin line or thread of silk passing round the middle of the body, which, except in the genus *Ornithoptera*, usually holds it in a horizontal position instead of its being suspended in a perpendicular position, head downward, as in the *Nymphalidæ*. The larva is long, usually tapering toward the anal extremity, frequently ornamented with brilliant colors, and in the genera of *Ornithoptera* and *Papilio* is provided with a protective scent organ placed at the back of the head which can be protruded at the pleasure of the animal. This organ is forked and is usually extended when the insect is irritated.

To this group of butterflies belong many of the largest and most grandly colored Lepidopterous insects of the world. It comprises the magnificent butterflies belonging to the genus *Ornithoptera*, specimens of which frequently expand seven or eight inches between the tips of their velvety wings, and the regal *Papilios* or swallow-tailed butterflies, wherein the lower wings are usually prolonged into tails at their lower extremity, and which in the coloring of many of the species are incomparably beautiful. It also includes a host of species belonging to the family *Pierinæ*, so familiar to every one, and having white or yellow for the principal color of their wings.

To the genus *Colias* belongs a large number of species of medium-sized butterflies widely distributed over the northern hemisphere. They are among our most common butterflies in the United States, and are familiar objects to every one who has an opportunity to see the fields and meadows in summer. Their colors are various shades of yellow or orange with heavy black borders to the wings in the males, while in the females their coloring is less sharply defined and not so heavy. The caterpillars are cylindrical, long, and taper slightly toward their posterior extremity, and are green in color, feeding largely on clover. Their chrysalides are pointed at the



UPPER SIDE



UNDER SIDE

COLIAS PHILODICE

head, have a convex breast and a hump on the thorax. Many of them are green in color.



Colias philodice. Male.

Our best known species of this genus is *Colias philodice*, an insect which ranges over the whole of our country east of the Rocky Mountains. It is common in summer in almost every field, and may be seen by dozens quietly resting with wings erect, sucking



Colias philodice. Female.

the moisture from the muddy pools in the roads. A good many varieties occur, and one may find many albinos and also dark rich specimens if the trouble be taken to search for them. The caterpillar feeds on the clover. It is grass green and striped with light green.

Several broods of this insect make their appearance each season, so that it is rarely absent from our fields in summer.



Colias philodice. Female, albino.

Colias eurytheme has much the same habits as the preceding, except perhaps that it is more agile on the wing. It is found in the middle



Colias eurytheme. Male.

and western states in abundance, and even extends across to the Pacific coast. It also occurs in New England, though I have never known it to be common there. Its bright orange colors make it a conspicuous object while on the wing. The species is very subject to variation in color and size; some specimens are intense orange, while others are yellow, scarcely showing a tinge of the orange.



UPPER SIDE



UNDER SIDE

COLIAS EURYTHEME

Albinos, looking much like the albinos of the preceding species, are not rare, and very dark insects are occasionally taken. In all its varieties it is an attractive insect, and the dark rich colored females are very beautiful. There are two or more broods in a season, the



Colias eurytheme. Female.

first making its appearance in May and others coming through the latter part of the summer and fall. It is most numerous in August in open fields and meadows, and neglected pastures where thistles and burdocks abound are its special delight.



Meganostoma cæsonia.

The genus *Meganostoma*, which closely resembles *Colias* except that the apex of the wing is more pointed, is represented throughout the region east of the Rocky Mountains by *Meganostoma cæsonia*.

The colors are black and yellow, the wings being frequently edged with a narrow line of pink. The rather vague and fanciful resemblance of the yellow patch on the upper wing to an animal's head has given the insect the common name of the dog's-head butterfly. The insect is yellow beneath, with spots as shown in the illustration.



Meganostoma caesonina. Under side.

The sexes differ little in coloring. This species is much more abundant in the south and southwest than in the east and north. I have never taken it in New England, but found a good many specimens near Iowa City, Iowa, in August. It is a good flyer, and one is obliged to move rapidly and use the net skilfully to capture many specimens.

A very beautiful species of this genus, *Meganostoma eurydice*, a native of California and the Pacific coast, displays in the male insect bright pink and purple iridescence almost dazzling to the eye.

The genus *Gonepteryx* contains some large and very showy butterflies. The shape of the wings is peculiar, in that they are angular and look as if trimmed with the scissors, the upper wings having the upper margin strongly bowed and ending in a blunt point, while the lower pair have a decided point midway on the outer margin. The veins of the wings are large and raised, and from the under side the insect bears a striking leaf-like look. But two of the large and handsome species of this genus are found in this country north of Mexico, and they must be regarded as stragglers from more tropical climes.



UPPER SIDE



UNDER SIDE

MEGANOSTOMA CAESONIA



Upper side.



Under side.

GONEPTERYX CLARINDE.



UPPER SIDE



UNDER SIDE

GONEPTERYX MAERULA



UPPER SIDE



UNDER SIDE

ONEPTERYX CLORINDE

Gonepteryx mæcula is a large and handsome species, and is of a very pure citron yellow with a conspicuous black dot above the middle of the fore wing and a few faint dark spots along the outer



Gonepteryx mæcula.

margin. It is a striking object on the wing and is common in the warmer parts of Mexico.

The other species, *Gonepteryx clarinde*, is almost white with a bluish green shade. A long yellow patch, beginning near the middle of the upper margin of the upper wing, extends half way across the membrane. It includes in its outer margin a black spot surrounded by a ring of orange. A small dark spot is located near the centre of the lower wing, having an orange ring surrounding it also. Beneath, the insect is light green, the lower half of the upper wings being almost white. Faint buff lines extend along the larger veins, and a fine stipple of this color may be seen on the membranes if closely inspected. The dark spots of the upper side are faintly indicated by a pinkish shade beneath. The strong raised veins of the under side are undoubtedly a protection to the animal when at rest, as it is very leaf-like in appearance. This butterfly is common in the

warmer parts of Mexico and Central America, and many specimens annually find their way to this country with collections of dried insects in papers. It is a good flyer, but like many of its near relatives is very fond of alighting on the wet mud of roads or the banks of streams.

A plain yellowish white insect, about the size of or a little larger than our common yellow butterfly, and inhabiting Florida and the gulf states, is *Kricogonia lyside*. While the female is almost an even shade of yellowish white, the male has a yellow patch at the base of the upper wings and a darker shade at their tip. A conspicuous dark spot is located just below the upper margin of the lower wings. I have never seen this insect alive and know nothing of its habits.

Callidryas contains several bright and gaudy butterflies of various shades of orange or yellow. Some of the species are of good size, and



Callidryas eubule. Male.

on account of their clear and pure colors are showy objects when flying or preserved in one's cabinet. The genus is represented by species from many parts of the world, but those from Mexico and Central America are among the finest.

One of our best-known species is *Callidryas eubule*, an insect which is plentiful in the south and not infrequently is to be seen in New Jersey and southern New York. Its brilliant yellow color and



UPPER SIDE



UNDER SIDE

CALLIDRYAS EUBULE

its size render it conspicuous as it flits across the fields. It is a good flyer, and the young collector will need to use his legs as well as his net to capture it. The male insect is of a plain lemon yellow and is



Callidryas eubule. Female.

without markings above, having a few small, faint reddish brown spots beneath. The female has a dark brown spot above the middle of the upper wing and several light brown spots along the outer margin. The caterpillar is green, and feeds on the cassia.



Chrysalis of *Callidryas eubule*.

The chrysalis is very peculiar in shape, being concave at the back and extending out into a wide flat keel or ridge on the breast.

The insect ranges from the latitude of New York City, in the United States, south through the whole of Central and South America to Patagonia.

An insect second to none of the family in showy coloring is *Callidryas philea*, which, with its large size and its brilliant yellow



Callidryas philea. Upper side.

and orange wings, is one of the gayest of butterflies. The home of this creature is tropical America, but it strays into the southern states of our country and is not rare in Texas. It is very abundant in the low lands of Mexico, and my brothers found it numerous in Colombia, South America, although always a difficult insect to capture on account of its strong and rapid flight. The ground color is bright yellow with a large orange patch extending from the upper margin of the upper wings half way across them. A wide band of orange blending into the yellow follows the outer margin of the lower wings. Beneath, the insect is strong Naples yellow, lighter on the lower half of the upper wings.

Another fine insect is *Callidryas cypri*, in which the lower wings at their lower portion are carried out into short rounded tails. The ground color is bright yellow with a large area in the middle part



Upper side.



Under side.

CALLIDRYAS CIPRIS.

of the upper wings and a broad band on the outer margin of the lower pair, tinged with orange. This orange tint is sometimes



Callidryas philea. Under side.

almost wholly wanting. Beneath, the color is yellow, diversified with a stipple of brown and brownish orange, in places arranged in vague lines. A light spot above the middle of the upper wing is surrounded with a ring of brown, while two silvery spots similarly surrounded, adorn the lower pair. Seen either from above or below, the butterfly is very handsome. Like the last species, this butterfly is principally an inhabitant of tropical America, and is rare in the United States. Many glorious specimens come from the hot low lands of Mexico.

Callidryas argante is deep orange in color, lighter along the inner margin of the lower wings, and having a few brown markings along the outer margins of both sets of wings, more distinct at the apex of the upper pair. The color beneath is slightly lighter, but is variegated with a brown stipple arranged in indistinct wavy lines, very similar in pattern to the last described species. Two spots of silver are also present near the middle of the lower wings. This insect is only

found in the extreme southern portion of our country, but it abounds in Mexico and Central America.



Callidryas argante.

Another species or variety of the present species goes by the name of *Callidryas agarithe*. The insect is slightly lighter in its



Callidryas argante. Under side.

coloring, and the under side is not quite so profusely marked with the brown stipple. Otherwise it is indistinguishable from *Callidryas argante*, and occupies the same territory.



UPPER SIDE



UNDER SIDE

CALLIDRYAS AGARITHE

The genus *Pieris* contains a large number of white butterflies of medium size, many of which are adorned with spots or markings of dark brown. Beneath, they are frequently yellowish white in color. The caterpillars are generally green, and feed on cruciferous plants, some of the species doing considerable damage.

The chrysalis is somewhat angular, usually light in color, and although naked and fragile, and usually exposed to every breeze that blows, it is capable of withstanding the severe frosts and storms of winter, and rides safely anchored by its silken threads. The insects inhabit chiefly the northern hemisphere of both the old and the new world.

Our most abundant species is *Pieris rapæ*. This insect is a European importation which has driven our native white *Pieris oleracea* almost out of existence. It is one of the most plentiful of butterflies, making its appearance early in the spring, and being two or even three-brooded in some localities. It has a wide distribution over our country and Europe. The larva of this butterfly is a great enemy to the market gardener and farmer, sometimes devouring his young cabbages and cauliflowers to such an extent that nothing but the bare stalks remain standing in the field.

The larva is green and covered with short down or fine hairs. The chrysalis is grayish or sometimes light green. This insect has gradually spread over the entire continent, and may be seen flying in swarms over fields of cabbages or turnips anywhere from Maine to Texas, New York to California, and no field of cruciferous plants is safe from its attacks.

The heads of the cabbages are often riddled and rendered worthless by the holes made by the larvæ, and to destroy them is not an easy matter. Catching the butterflies with a net when first they make their appearance and before they can lay their eggs on the young plants, is perhaps the best method of keeping their numbers down. The vigorous use of the net for an hour a day for two or three days at the right time, will so reduce the numbers of this pest that the plants will get a good start. This is preferable to using emulsions of any sort to kill the caterpillars, as they are apt to make the plants unfit for food, a matter of considerable importance to the agriculturist.

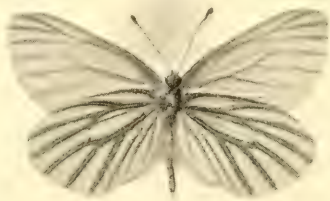
Pieris oleracea, a butterfly which not long ago was plentiful over a large part of the north-eastern United States, presumably owing to the introduction of *Pieris rapæ*, has now become very scarce except

in one or two localities, where it may still be found in some abundance. I refer to the White Mountain region of New Hampshire, and the Adirondack region of New York.



Pieris oleracea.

It is a delicate little creature varying from pure white to yellowish white streaked with gray on the veins above, while below the veins on the lower wings are margined by gray, and the tip of the



Pieris oleracea. Under side.

upper wings and all of the lower pair are yellowish. No less than ten different varieties of this species, each with its three scientific names, are recognized by entomologists. Let us hope that the Latin names may hold out to christen all the new varieties which may be discovered in the future, or that like this butterfly, the species-maker who manufactures new names by the wholesale may be started on the road to extinction by the law of the survival of the fittest.



UPPER SIDE



UNDER SIDE

PIERIS RAPAE

A pretty little species which inhabits the eastern half of the country is *Pieris protodice*. Like many of its near relatives its



Pieris protodice. Male.

larva feeds upon cruciferous plants, doing much damage to the growing crops, and when plentiful it is somewhat of a pest.



Pieris protodice. Male. Under side.

There is a good deal of variation in the species, and the sexes are unlike, the male being almost pure white with a few dark spots, while the females are clouded, and the veins on the under side are margined with lines of yellow. This insect is not common in New England, but in the west and south it may be seen flitting low over the fields, or on the blossoms of weeds during the summer and autumn.

The genus *Terias* is widely distributed over most parts of the world. It comprises a large number of butterflies of small



Pieris protodice. Female.

size, whose colors are mostly yellow or orange with black borders. Two or three species are very abundant in the eastern half of our country.

Terias lisa is a little butterfly, which, while on the wing, one might easily mistake for a small specimen of *Colias philodice*. It is thin and delicate, seemingly a very frail creature. It sometimes makes its appearance in great numbers, and has even been seen at sea many miles from land, where it doubtless had been swept by



Terias nieippe. Male.

strong currents of air. It is distributed over the whole eastern half of our country except the most northern part, and although

not commonly seen in New England, it is very abundant in the south and west.

Like many of its near relatives there is a good deal of variation in coloring between specimens, and albinos are not rare. The caterpillar feeds on the cassia.



Terias nicippe. Male. Under side.

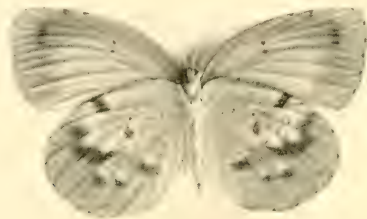
A bright and pretty insect, which is frequently so abundant in the south and west as to be a feature in the landscape, is *Terias nicippe*. The deep orange wings bordered with sharply defined bands



Terlas nicippe. Female.

of black of the male insect contrast strongly with the pale orange or sometimes yellow clouded wings of the female. Considerable variation exists too, between individuals of the same sex. This butterfly actually swarms in Tennessee at certain seasons, and I

recall with pleasure an early morning ride during August over the rich alluvial plains along the Mississippi River, where hundreds if not thousands of these insects were to be seen. As we jogged along over the country road, the dark, luxuriant, almost tropical forest on both sides, the scene was enlivened by these butterflies as



Terias nicippe. Female. Under side.

they rose in numbers from the grass, sometimes appearing like a small cloud about us. They were not wild, and soon settled again among the grasses by the road side. This insect is rarely seen further north than the latitude of New York City, and is most abundant in the southern states, whence it ranges south into Mexico, Central America and South America. The larva feeds on the cassia and clover.



Terias jucunda.

A tiny and very delicate creature is *Terias jucunda*. The colors are bright yellow and black, disposed as shown in the illustration, while the under side, particularly of the lower wings, is very light or almost white, the upper pair being light yellow bordered by light



UPPER SIDE



UNDER SIDE

TERIAS NICIPPE

gray. This insect is abundant in the states bordering on the Gulf of Mexico. It is of feeble flight, keeping near the ground and seldom flying far at a time. Two or three other species of this genus closely resembling this one are found in the southern states. This species, however, is lighter beneath than the others.



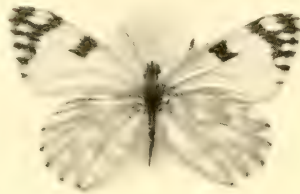
Terias proterpia.

A butterfly belonging to this genus, of a deep orange color and with angular outlines to the wings, is *Terias proterpia*. Along the upper margin of the upper wing is a heavy black band shading into gray. This color is continued, although very faintly, on the outer margin of the lower wing. The veins of the lower wings and the outer portion of those of the upper pair are black. This little butterfly is found in Texas and Mexico, and I have a number collected in Colombia, South America. I have never seen the insect alive and can give no information as to its habits.

Some very prettily marked butterflies belong to the genus *Anthocharis*. They are small, frail creatures, weak in flight, their delicately tinted and rounded wings suggesting the petals of a flower. Their usual color is creamy white with brown markings. The tip of the upper wing is usually occupied with a brown patch, in the middle of which in many species is an orange or red spot. Others lack this orange spot except in the male insect, and others still do not have it in either of the sexes. The lower wings are usually margined with brown spots. The under side of the lower wings is mottled with green, giving them a mossy appearance. This mottling also occurs near the tip of the upper wings beneath, and the orange spot where present is sometimes reproduced below. The wings are very thin and the moss-like markings on the under side

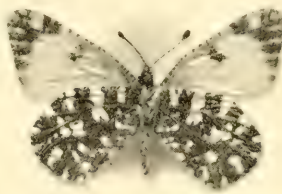
of the lower wings is readily seen through them from above, where they appear as a gray shade. We have but two species in the eastern half of our country, but several very beautiful kinds are natives of the Pacific coast, where they are not rare.

I can remember one very delightful morning in May, many years ago, spent at what was then the gold mining town of Sonora, California. The gold has since been washed from the bed of the streams and the people have mostly turned their attention to agriculture. At the time of my visit it was the centre for a lively mining population



Anthocharis olympia.

and on going out to view the placer works, with their heaps of *débris*, the hundreds of pits and miles of flumes, I was surprised to see a number of these little butterflies flitting about the weeds which



Anthocharis olympia. Under side.

grew among the heaps of boulders. I straightway secured my net and after half a day of clambering over the rocks in the hot sunshine I filled my box with specimens in their papers. It was warm

and fatiguing work, but I enjoyed it. The miners seemed to enjoy it too, for once when I missed my footing and rolled down a steep bank into a puddle of muddy water, a roar of laughter went up from half a hundred lusty throats. But I didn't care; they had their laugh and I had the butterflies. I only wish I now had a few of the dozens of beautiful *anthocharis* I captured that morning.

Anthocharis olympia has no orange spot at the apex of the fore-wing in either sex, but it is a very pretty little butterfly nevertheless. The upper side is creamy white with brown markings, arranged as shown in the illustration. the mottlings of the under side of the lower wings showing distinctly through. The under side is mottled with olive green on a white ground, giving a very pretty effect. It is found in Texas.



Anthocharis genutia.

Anthocharis genutia is found from New England south, although I have never seen it very abundant anywhere. This insect can be



Anthocharis genutia. Under side.

readily recognized by the hooked or falcate forward wing. It is very frail and of feeble flight. The insect is white, the tip of the forward wings of the male being orange, while in the female it is

spotted with brown without the orange. The under side is delicately marbled with olive green and brown.

I have taken this butterfly near Washington, D. C., where one



Anthocharis genutia. Female.

may collect half a dozen specimens in a day at the right season. It is one of our prettiest species, and nearly always attracts attention in one's cabinet.



Parnassius clodius.

An interesting group of butterflies is the genus *Parnassius*, in which the wings are so thinly covered with scales as to be partially transparent. The colors are light yellowish white with brown or slate colored markings and red or yellow spots, while they have a decidedly moth-like look from the amount of down or soft hairs on

the surface. The bodies of these insects are dark in color and very hairy.

The larvæ are dark colored, flattened beneath, and pass through their transformations on the ground, gathering a few bits of leaves or twigs into a loose cocoon, which is held together by silken threads.

These butterflies are all inhabitants of mountainous districts and are found both in the old world and the new. While we have no species of this genus in the eastern part of our country, they are found on the Sierra Nevada and Rocky Mountains as far east as Colorado.

There is great variation in the coloring of the specimens, individuals ranging from almost white with yellow spots to slate color with red spots. These insects are not difficult to capture, as they fly near the ground. I have never seen them abundant, and by collectors in this country they are generally considered most valuable specimens to possess.

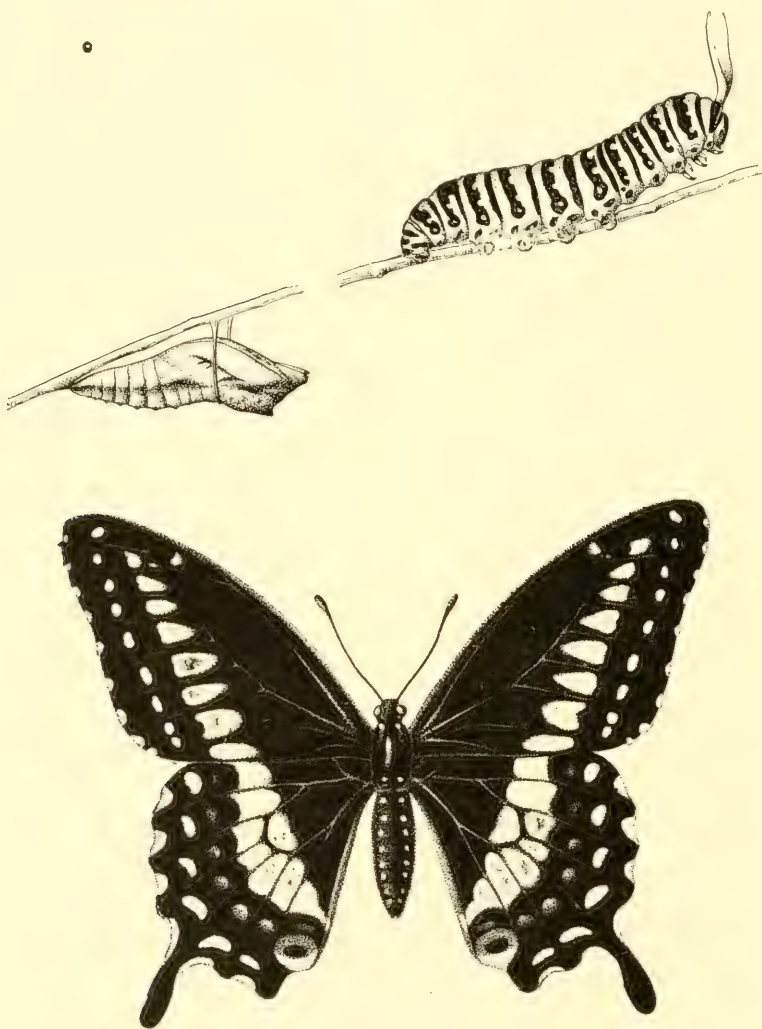
In the genus *Papilio* are classed many of the largest and handsomest butterflies the world affords. The group reaches its greatest development, both as to the number of the species and the extraordinary beauty of their coloring, in southern India and throughout the islands of the Malay Archipelago, but we have many very fine species in our country and in Mexico and South America.

Rev. J. G. Wood, in writing of this group, says: "The genus is a very comprehensive one, including between two and three hundred known species, among which may be found almost every imaginable tint in every gradation and exhibiting bold contrasts of color which scarcely any human artist would dare to place together, and which yet produce a result equally striking and harmonious."

The group has been divided into several genera by some authors, and although the general characteristics of the species thus separated are not difficult to follow, they seem somewhat arbitrary, especially as there is a great similarity in the habits and development of the species of the whole group. Had there been but a few species of the various classes, instead of dozens or scores, the genus would probably have been left entire, much to the satisfaction and convenience of those who wish to acquire knowledge on the subject of entomology.

Many of these butterflies are supplied with tails or prolongations to the lower wings which add much to their beauty. In some these tails are long and narrow, in others short and wide, while a few of the species are destitute of tails. Their larvæ are fleshy, of various

colors, and some are supplied with soft horns or filaments growing from various parts of their bodies. At the back of the head of the



Metamorphosis of *Papilio*.

larva is situated a forked organ giving off a powerful odor, which is doubtless used as a means of protection against its various enemies. When not in use this organ is retracted and entirely concealed. The larvae feed on various trees and herbaceous plants, but are

seldom sufficiently plentiful to do much damage. The chrysalides of many of the species are protected by their coloring, some being brown or gray and imitating bits of bark or decayed wood, while others are green, and when hidden among the leaves are very difficult to see.

According to Mr. Henry Edwards, "Twenty species, or at least strongly marked forms of true *Papilio* may be credited to the United States."

Papilio turnus is one of the largest and handsomest species of this group found within the borders of our country. It is an abundant insect over a large part of North America, but is replaced on the Pacific Slope by two or three allied forms not very different in size and coloring.

Specimens of this species vary greatly in size, ranging all the way from the small New England insects, frequently less than three and one-half inches in expanse of wings, to the magnificent creatures seen occasionally from southern Illinois southward, five and one-half or even six inches across. These large insects are often truly grand in coloring, and easily take a place among the princes of the butterfly world. In New England the species makes its appearance frequently as early as the middle of May, and is usually plentiful for three or four weeks. Stragglers may occasionally be taken during the latter part of summer and early in the fall, but the insect is single brooded, except possibly in the southern part of its territory.

When the foliage is fresh and green and the woods resound with the songs of birds and the hum of insect life awakened from its winter sleep, our beautiful tiger swallow-tail, as it is commonly called, delights to congregate about sunny openings in the forest, chasing each other high up among the oak leaves, or opening and shutting its gaily tinted wings as it alights on the lower shubbery. The butterflies are not very shy at these times, and one may quietly walk into their chosen playground without disturbing them. They frequently quit the forest in quest of sweets, and visit the cultivated fields. The syringa is one of their favorite flowers, and so intent are they on extracting the honey that one may frequently capture them with the fingers. With other species of butterflies they congregate in great numbers on the muddy banks of streams or lakes or at wet places in the roads, where one may take a dozen or more with one sweep of the net. A friend of mine tells of seeing a patch of these butterflies covering a space of several square feet, resting on the mud near a lake in northern New Hampshire, where he has been accus-

tomed to spend a part of each summer camping. Hundreds of these insects were congregated on the shore, and the birds, frogs and toads were reaping a harvest. They are usually exceedingly plentiful near Sunapee Lake, in New Hampshire, during the latter part of June, and make an interesting picture as they rise in a swarm from the lake shore on being disturbed. But they never look more rich and beautiful than when flying by twos and threes about in the sunshine with the fresh young leaves of the oaks for a background.



Papilio glaucus.

In the southern and western States a beautiful dimorphic form of the female only of this species may occasionally be taken. It is called *Papilio glaucus*, and a truly magnificent insect it is.

An idea of its size and shape will be had from the accompanying plate, but its rich black wings stippled with blue over a large part of



UPPER SIDE



UNDER SIDE

PAPILIO TURNUS

their surface, can be but partially appreciated from what is shown in the accompanying figure. The insect is so dark that it looks at first sight like a very large and fine *Papilio troilus*. A closer inspection reveals the true character of the creature, as the dark bands so conspicuous on the common form can be faintly seen on the under side of the wings of this variety.



Papilio glaucus. Under side.

The larva feeds on apple, birch and wild thorn, and is green in color, with two eye-like spots on the thorax. It resembles the larva of *Papilio troilus*, of which a figure is given on page 351. It is a rather difficult creature to find, and its chrysalis, which is usually attached to a twig or branch, is gray and brown in color and looks not unlike a piece of loosened bark.

Papilio rutulus very closely resembles *Papilio turnus*, and takes the place of that species on the western half of the continent. The females never assume the dark color of the dimorphic form of

Papilio turnus. My brother found this butterfly, with *Papilio zolicaon*, the western representative of *Papilio asterias*, very abundant at Franktown, near Washoe, Nevada, during the month of June.



Papilio rutulus.

In habits it much resembles its near relative in the east, and was taken in numbers with a decoy placed within reach of the net where the insects were at play.

Another very large and beautiful butterfly is *Papilio daunus*. It closely resembles *Papilio turnus* in coloring, but the points on the lower wings are lengthened into tails which add much to the beauty of the insect.

The species is most plentiful in Colorado, New Mexico and Mexico, but specimens have been taken in Kansas and Texas. The one here figured is from the City of Mexico, where it is not rare in March and April, then frequently visiting the flowers in the public squares. It is often seen flying high over the houses, but when feeding on the flowers is easily taken. Considerable variation

in coloring occurs, some specimens being almost orange, while others are light yellow.



Papilio daunus.

One has to use great care in removing these grand insects from the net, as the slender tails of the lower wings are easily broken.

An insect which looks a good deal like *Papilio daunus*, except that it is smaller and the bands of black on the margins of the wings are broader, is *Papilio pilumnus*.

The points or tails on the lower wings are even more marked than in *Papilio daunus* and the insect is of somewhat slighter build. It is a very beautiful butterfly, but is more a Mexican insect than properly belonging to our fauna. It is occasionally taken in Arizona and Texas.

A butterfly which looks as if it had in part borrowed its shape from *Papilio turnus* and its colors from our next species, *Papilio ajax*, is *Papilio eurymedon*. This insect belongs to the western half of the continent and is plentiful along the eastern base of the Sierra Nevada in June and July. The caterpillar resembles that of *Papilio turnus*.



Papilio ajax. Early Spring Form.

Having little similarity to, and therefore easily distinguished from our other species of *Papilio*, is *Papilio ajax*. Like so many of this fine family it is an exceedingly beautiful insect. Several varieties of the butterfly are recognized by naturalists, each having its own name, which were at one time supposed to be distinct species. It has been discovered, however, by careful observation that all the varieties may spring from the same set of eggs, those which emerge from the chrysalides early being the smaller and lighter and having short tails to the hindermost wings, those which hatch later being somewhat larger and darker, with longer tails, and those which are developed from the eggs and larvæ the same season being the larger, with wide bands of black and having long tails. The accompanying figures will give a clear idea of the differences between the varieties.



Late Spring Form.



Summer Form.

PAPILIO AJAX.



UPPER SIDE



UNDER SIDE

PAPILIO AJAX

When fresh from the *chrysalis* with its velvety wings in the height of perfection, there are very few insects more beautiful than this. The graceful shape of the insect, with the delicately tinted green stripes across the wings between the bars of dark brown and black, and the touches of blue and red on the lower wings, make it exceedingly attractive, and the young collector is likely to feel a thrill of pleasure as he takes from his net the first perfect specimen. It is a rare butterfly in New England, but is occasionally taken in the lower Connecticut valley. Throughout the middle and western states, ranging as far west as the Rocky Mountains, and in the south, it is a common butterfly. I have had many small and brilliantly



Chrysalis of *Papilio ajax*.

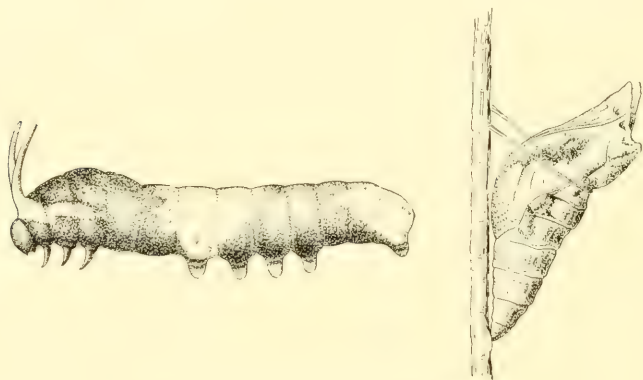
colored specimens from Florida and have collected large and fine ones in southern Ohio. Near Chillicothe, Ohio, it is exceedingly abundant during the summer, where it may be seen flying along the roads and paths by the river or alighting in the fields of clover.

A week's collecting during July, on the banks of the Little Miami River, near Fort Ancient in southern Ohio, where I procured, among others, many grand insects of this species, I remember as one of my pleasantest experiences in butterfly hunting. It is a grand locality for collecting, and the fertile valley, with its groves of large forest trees and fine farms, makes it an ideal spot for a short stay. The butterflies were most numerous along the banks of the little river and *Papilio ajax*, with its tails looking like streamers attached to its lower wings, was one of the most abundant species.

The food plant of the larva is the paw paw, and with caution the female butterfly could be approached and watched while she deposited her eggs singly on the under side of the leaves. The plants

selected for this purpose were usually the low bushes not over a foot or two high, and three or four of the light green larvæ were sometimes seen quietly feeding on one bush. Toward evening the butterflies collected about the paw paw bushes and settled for the night clinging to the under side of the leaves, where early in the morning they might be taken with the fingers. Many of the transfers of this species for this work have been made from butterflies taken in southern Ohio. It is not difficult to rear this insect in captivity. Some of the chrysalides are light green and others brown, and are translucent until the butterfly begins to form beneath the outer shell.

Several very beautiful species closely allied to *Papilio ajax* are natives of Central and South America. In Colombia my brothers took some of the largest and finest of the group, specimens of which now adorn our cabinets.



Larva and chrysalis of *Papilio cresphontes*.

One of our largest and most strikingly colored butterflies is *Papilio cresphontes*, a very good idea of which may be had by reference to the transfer.

The contrast between the upper and under side of the insect is very marked, and when on the wing the butterfly looks black at one moment and yellow at another, according to which side of the wings is seen by the observers. The home of this fine butterfly is in the southern and western states, but it is sometimes to be found in the north and several specimens have been taken near my home in Massachusetts within the last few years. It is abundant in southern Illinois in July, and is not at all rare in southern Ohio at that season of the year. On looking out of the car window as the train stopped for

a few moments at the small station of Fruitland, near Lebanon, Ohio, some years ago, I was a good deal surprised to see a clover field near by alive with this insect. They were flying in dozens over the field and opening and closing their wings as they rested on the clover blossoms sipping the honey. In the southern states and Mexico this is one of the commonest of butterflies.

The larva feeds on the leaves of the orange and lemon trees and at times is sufficiently plentiful to do some damage. It is a large and formidable looking creature, being purplish brown in color, with large patches of light yellow disposed as shown in the accompanying illustration. The chrysalis looks a good deal like that of *Papilio asterias* in shape, but is larger and rougher and is mottled with brown, purple and yellow.



Papilio thoas.

Closely allied to *Papilio cresphontes* and looking a good deal like it is *Papilio thoas*. The two species are easily separated, *Papilio*

thoas having longer and more slender tails and a wide yellow band on both sets of wings, while the row of yellow spots between the yellow band and the outer margin of the upper wings in *Papilio cresphontes* is often wanting in this species. The butterfly inhabits Mexico



Papilio thoas. Under side.

and Central America, where it is abundant. It is sometimes taken in Texas. The caterpillar, like that of the preceding species, feeds on the lemon and orange.

Papilio asterias appears in May and June and again in August. It is a handsome butterfly and one which will early attract the attention of the young entomologist.

The different stages in the life of this insect are shown on page 334.

The eggs are laid by the female on the young plants of the carrot, parsley, parsnip, etc.

When young, the larvæ are black, with a white band across the

middle, and orange spots on the sides. They change their color at each moult and on reaching maturity are light green, with bold black bands, which partly enclose a number of bright yellow spots. Upon being disturbed, the larva protrudes a forked scent organ from just back of its head, which gives off a disagreeable odor. This organ is orange in color and by the manner in which it is used, one might suppose the insect to be venomous. Except, however, for the havoc which the insect sometimes makes in the vegetable garden, it is harmless.

The caterpillars are exceedingly subject to the attacks of parasites, and it frequently happens that from one hundred of them, one will obtain but half a dozen butterflies.

An interesting account is given by Mr. Harris in his "Insects Injurious to Vegetation" of the manner in which the larva of this species prepares for its change into the chrysalis state and its hatching into the butterfly. He says, "The caterpillars usually come to their full size between the 10th and 20th of July and then measure about one inch and a half in length. After this they leave off eating, desert the plants, and each one seeks some sheltered spot, such as the side of a building or fence, or the trunk of a tree, where it prepares for its transformation. It first spins a little web or tuft of silk against the surface wheron it is resting, and tangles the hooks of its hindmost feet in it, so as to fix them securely to the spot; it then proceeds to make a loop or girth of many silken threads bent into the form of the letter U, the ends of which are fastened to the surface on which it rests on each side of the middle of its body, and under this when finished it passes its head, and gradually works the loop over its back so as to support the body and prevent it from falling downwards.

"Though it generally prefers a vertical surface on which to fasten itself in an upright position, it sometimes selects the under side of a limb or of a projecting ledge, where it hangs suspended, nearly horizontally, by its feet and the loop.

"Within twenty-four hours after it has taken its station, the caterpillar casts off its caterpillar skin and becomes a chrysalis or pupa of a pale green, ochre yellow or ash gray color, with two short, ear-like projections above the head, just below which, on the upper part of the back, is a prominence like a pug nose. The chrysalis hangs in the same way as the caterpillar and remains in this state from nine to fifteen days, according to the temperature of the atmosphere,

cold and wet weather having a tendency to prolong the period. When this is terminated, the skin of the chrysalis bursts open and a butterfly issues from it, clings to the empty shell till its crumpled and drooping wings have extended to their full dimensions and have become dried, upon which it flies away in pursuit of companions and food."



Papilio asterias. Male.

Mr. Harris, I think, errs in stating that the larva spins a silken girth and then "gradually works the loop over its back," as those which I have watched during this performance have spun the girdle from side to side *over* the body, bending the head backwards and attaching the thread of silk on each side, repeating the operation until the loop was sufficiently strong to hold its weight.

So plentiful are the chrysalides at times that I have taken dozens of them from the underside of the capping board of a fence which bounded a neglected field of carrots, where the plants had been stripped to mere stalks by the caterpillars. This butterfly is often seen in company with other species along country roads, but is not an easy species to capture, being rather shy and flying rapidly when alarmed.



UPPER SIDE



UNDER SIDE

PAPILIO ASTERIAS

If one desires to rear it in numbers, a female should be captured and induced to lay her eggs on a bunch of the food plant, and when the young caterpillars appear they should be fed with tender shoots and protected from the parasites.



Papilio asterias. Female.

There are two broods in one season, and the last, after hatching into larvæ and turning to chrysalides, hibernate during the winter in this state.

The male and female butterflies may readily be distinguished from one another, the former being usually smaller and more strikingly marked, with the yellow spots brighter and more sharply defined. The female frequently lacks the inner row of large yellow spots seen on the upper wings of the male, they being sometimes reduced in size or wholly wanting, while the lower wings are usually adorned with more blue than is to be found on the wings of the male.

Beautifully colored varieties of this butterfly are occasionally taken, where yellow and rusty red occupy a large part of the area of the wings.

The insect inhabits the whole of the United States east of the Rocky Mountains, and the southern part of Canada.

Papilio zolicaon resembles *Papilio asterias* in size and shape, but has much more yellow on the wings, the spots having widened and lengthened out into wide bands crossed by the dark lines of the veins.



Papilio zolicaon.

This insect inhabits the western half of the continent and is plentiful in California, where it has much the same habits as *Papilio asterias*, the larvæ feeding on the same plants.

Another insect somewhat resembling *Papilio asterias* but having much more black than the preceding species is *Papilio indra*. The tails, however, are very short and the yellow spots are lighter and run more together than in either of the other species.

It is an inhabitant of the western half of the continent and was taken in some numbers by my brother on the mountains in California.

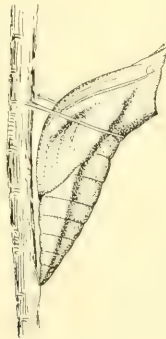
A large and showy butterfly is *Papilio troilus*. This insect is common throughout the eastern half of the continent during the summer months and is familiar to every collector. It somewhat resembles the female of *Papilio asterias*, but can be readily distinguished from that insect by observing the red and yellow spots on the under side of the wings, which are duller in color and more

nearly round than in *Papilio asterias*. There are also several other well-marked characteristics by which the insects may be separated.



Larva of *Papilio troilus*.

The female deposits her eggs singly on the leaves of the spice bush and sassafras, and the young larva is no sooner out of the egg than it begins to prepare a habitation for itself where it shall be safe from the prying eyes of the insect-eating birds. This is constructed in the following manner. Selecting a suitable leaf of its food plant, the larva commences to spin a fine web backward and forward across the middle portion of the leaf. As this web is stretched tightly, the



Chrysalis of *Papilio troilus*.

sides of the leaf soon begin to fold over and as the web is added to, they finally come together over the back of the insect, entirely shielding it from sight. Unlike some of the larvæ of other butterflies, which no sooner complete a home than they make their first meal off the leaves which compose it, this insect rarely or never nibbles its habitation, but keeps it in the perfection of good order and neatness. It rarely ventures forth during the daytime, but remains quietly resting upon its silken cot and at evening cautiously crawls out to feed upon the surrounding foliage. As the larva grows the

smaller home is exchanged for one more suited to its size, and it is not an unusual thing to find three or four leaves still green and perfect which have successively housed the same caterpillar.

The body of the larva is thick toward the anterior end, gradually tapering from the fourth segment backward.

Mr. Saunders, in describing a caterpillar of this species, which he found rolled up in a leaf of the spice bush, says: "Its length was about one and three-fourths inches, the body being thickest from the third to the fifth segments. The head is rather small, flat in front, slightly bilobed, dull flesh color, with a faint tinge of brown. The body is bright pea green, with a yellow stripe across the anterior part of the second segment, edged behind with dull black. On the fourth segment are two prominent eye-like spots, of dull yellowish or yellowish buff, encircled by a fine ring of black, and a large black pupil filling most of the lower portion. The posterior portion of this black pupil is encircled by a shining bluish black ring, the anterior portion of which strikes a little beyond the middle of the pupil; there is also a line of black in front of the pupil extending nearly across the yellow portion, and a pale pinkish spot in the upper part of the yellow which is edged with a slightly darker shade. On the fifth segment are two large irregular spots of the same color, pale buff, encircled by a faint ring of black, and having a faint pinkish spot on the anterior portion of each. These spots are nearer to each other than those on the fourth segment, a portion of the space between the fifth and sixth segments being deep black. Each segment, from the sixth to the eleventh, inclusive, has four blue dots, encircled with black, those on the seventh, eighth and ninth sometimes being largest. On each side, close to the under surface, is a wide yellow stripe, gradually softening into the green above, and edged below with blackish brown. Immediately below the spiracles is a row of blue dots edged with black, one on each segment, from the sixth to the twelfth, inclusive. The under surface is dull, pale greenish or yellowish white, having a decidedly reddish tinge as it approaches the yellow stripe on the sides. The feet partake of the same general color."

It is a plump, good-natured looking creature, and when fully grown is one of the handsomest of caterpillars. The eye-like spots have a droll, almost half-reproachful look, as if they expected you to beg their owner's pardon for taking the liberty to expose him to the daylight.



UPPER SIDE



UNDER SIDE

PAPILIO TROILUS

The caterpillar is easily reared in captivity, the chrysalis, if found in the autumn, remaining unchanged until the spring.

It is wood brown and has two ear-like projections on the anterior end. It is suspended by its posterior end, with a silken girdle about



Papilio palamedes.

its body, frequently in an upright position, and from a twig or branch. The butterfly is frequently seen in clover fields, where it may be closely approached as it thrusts its tongue into the tiny blossoms composing the heads of clover.

Specimens vary a good deal in size, but are surprisingly uniform in color, and among hundreds of specimens one will rarely find an insect showing great variation from the prevailing tints. The sexes, too, except for size, the females usually being the larger, are much alike.

Papilio palamedes is another grand butterfly. It inhabits Florida

and the gulf states, and occasionally strays as far north as Virginia. It is rich dark brown above, with light yellow spots. Below it is somewhat lighter, with faint yellow spots on the upper wings and two rows of orange spots on the lower pair. This insect is plentiful during March in southern Florida. Its larva feeds largely on the orange.



Papilio palamedes. Under side.

An insect of rare beauty and one of the finest of our native species is *Papilio philenor*. It is a widely distributed butterfly, being found over almost the whole of the continent from Massachusetts southward, and extending from the Atlantic to the Pacific coast.

Like many other species, it is exceedingly variable in its abundance, and although usually rare in New England, was three or four years ago, one of our most common *Papilios*. Our eastern specimens were, however, a good deal smaller and less beautiful than the grand



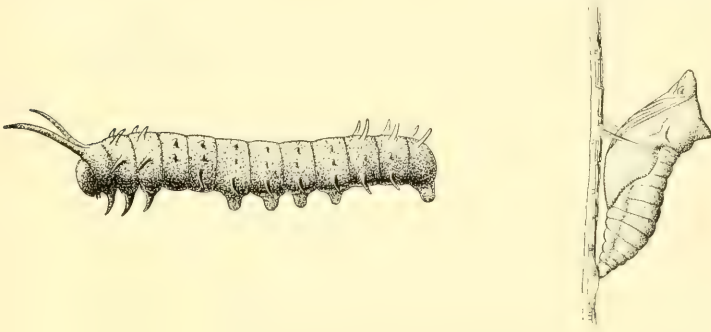
UPPER SIDE



UNDER SIDE

PAPILIO PHILENOR

insects found in the southern and western states. While fishing on streams in the west I have often seen this butterfly resting on the



Larva and chrysalis of *Papilio philenor*.

muddy banks, or flying leisurely along the wooded shores, the polished surface of its dark blue and green wings flashing in the sunlight and adding materially to the beauty of the scene.



Papilio polydamas.

It is often attracted to the flowers of the garden, and clover fields are a favorite haunt. In such places it is easily approached.

The larva feeds on the leaves of the pipe vine, or Dutchman's pipe, as it is more commonly called, and is a remarkable looking creature, being dark brown in color or sometimes even black, with rows of reddish spots and having many fleshy filaments or soft horns protruding from different parts of the body. The chrysalis is pink and brown, with mottlings of yellow on the back.

Papilio polydamas is easily recognized by its lack of the tails on the lower wings so characteristic of the genus *Papilio*. This insect inhabits Mexico and Central America and the West Indies, but is also found in Florida and Texas.



Papilio polydamas. Under side.

The predominating color is black with blue and green reflections, although less striking in this respect than the preceding species. The single row of spots inside the margins of the wings is yellow. Below the wings are brown, with the outer half of the lower pair black. A row of rusty red spots extends along the outer portion of the lower wing, and outside of this are several small silvery spots. A row of light yellow spots crosses the upper wings and both wings are margined with narrow, light yellow spots.

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